During her PhD study, Siwi Gayatri explored the situation of smallholder beef cattle farming in Indonesia, and on basis of this to discusses aspects of sustainability and the implementation of the policy of the so-called Beef Self-Sufficiency Program (BSSP). The participatory approach, to create the right conditions for sustainable farming practices based on locally available resources and on local skills and knowledge, was emphasised. The results of the study can be used as a first step to introduce and to motivate a sustainability concept not only for farmers in the beef cattle farming sector but also for Indonesian citizens. Interdisciplinary research is required to better understand the sustainability concept in the Indonesian beef cattle farming system, e.g. a combination of social science and animal science as important components in the sustainable development of the livestock farming system.

ASPECTS OF SUSTAINABILITY OF SMALLHOLDER BEEF CATTLE FARMING IN SEMARANG REGENCY, CENTRAL JAVA PROVINCE, INDONESIA

SIWI GAYATRI • PHD THESIS • 2016

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Aspects of Sustainability of Smallholder Beef Cattle Farming in Semarang Regency, Central Java Province, Indonesia
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Preface

The thesis entitled **"Aspects of Sustainability of Smallholder Beef Cattle Farming in Semarang Regency, Central Java Province, Indonesia"** was conducted from September 2012 to November 2015. The data gathering was carried out in Semarang regency, Central Java Province, Indonesia, while the data analysis and writing part were carried out at the Department of Animal Science, Faculty of Science and Technology, Aarhus University, where I have been part of the section Epidemiology and management.

The PhD project was funded by the Graduate School of Science and Technology of Aarhus University and the Ministry of Research, Technology and Higher Education, Republic of Indonesia.

The PhD project resulted in four research papers:
Paper 1, "The implementation of Indonesia's beef self-sufficiency programme (BSSP) as seen from a farmer family perspective", has been published in *the Journal of Rural and Community Development*, *10*(2), 166-186.
Paper 2, Bridging Expectations: "Extension Agents' Perception of a Gap between Expectations and Experience when Implementing the Indonesian Beef Self-Sufficiency Programme", has been submitted to *the International Journal of Agricultural Extension*.
Paper 3, "Assessing Sustainability of Smallholder Beef Cattle Farming in Indonesia: A case study using the FAO SAFA Framework", is planned to be submitted to *the Journal of Agronomy and Sustainable Development*.
Paper 4, "Indonesian Smallholder Beef Producers' Perception of Sustainability and Their Reactions to the Results of an Assessment Using the Sustainability Assessment of Food and Agriculture System developed by the UN FAO – A Case study Based on Focus Group Discussions", has been submitted to *the Journal of Rural and Community Development*.

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I would like to thank all farmers and extension agents in Semarang regency, Central Java Province, Indonesia, for their excellent contribution to my study.

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Several people have assisted me in many ways since set up the study until writing process. I would like to acknowledge the contributions:

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My sincere thanks to my colleagues in the group of Epidemiology and Management, AU Foulum for scientific support and social support. Mette Holme for always being helpful with all kinds of problems during my PhD and for motivating me to learn ”Dansk ”. Thank you, Lotte Hansen, for English proofreading of the thesis. Thank you, Inger Anneberg and Anna Braad Kudahl, for inspiration and encourament to my project. Thank you, Anna Feldberg Marsbøll and Lena Karina Hinrichsen, for valuable discussions, friendship, and spending the time to give comments on my thesis. Special thanks to my officemate, Britt I. F. Henriksen; you are extremely kind and generous and have encouraged me with ”Yes, I Can” motivation and mental support.

Despite the challenges, Denmark is a place that I can call home. I am thankful to all friends in Nørresø Kollegiet and friends in AU Foulum for making my life more colorful. Special thanks to Ole Jørgensen, Nuzul Widyas, Yi Peng, Mai Anh Ton Nu, Emmanuel Arthur and family, Beatriz; thank you for your love, understanding, and support. You guys have supported me during my ups and down. Thank you to my friends and family in Indonesia for their support in my difficult times.

My unconditional love goes to my siblings, Hesti and Aji, and brother in law and nephew. My everlasting love and sincere thanks to my parent who have allowed me to ”fly” and to explore my world. I dedicate this thesis to my parents, Wartiyem and Sriyatno. You are my strength, and because of you, I had the courage to achieve my dream.

List of Abbreviations

BSSP	Beef Self Sufficiency Program
COSA	Comity on Sustainable Assessment Tools
DGLS	Directorate General for Livestock and Veterinary Services
IUCN	International Union for Conservation of Nature and Natural Resources
FAO	Food and Agriculture Organization
KUPS	*Kredit Usaha Pembibitan Sapi, KUPS* (Credit for Cattle Breeding)
LP3	*Lembaga Mandiri yang Mengakar di Masyarakat, LM3* (Independent Community-Based Institutions)
RISE	Response-Inducing Sustainability Evaluation
SAFA	Sustainability Assessment of Food and Agriculture Systems
SMD	*Sarjana Membangun Desa, SMD* (Graduates Support Farmers)
WCED	World Commission on Environment and Development

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Summary

The overall objective of this study was to provide insight into the situation of smallholder beef cattle farming in Indonesia, and on basis of this to discuss aspects of sustainability and the implementation of the policy of the so-called Beef Self-Sufficiency Program (BSSP). The results of the study were presented in four papers.

The objective of the first paper was to investigate how Indonesian smallholder beef cattle farmers perceives their own beef-cattle production in line with the BSSP, with a particular focus on the way in which the policy was implemented. The study was based on 14 structured qualitative interviews carried out with smallholder beef-cattle farmers from the Central Java Province in Indonesia. The study showed that the farmers were mostly unaware of the existing government policies on beef-cattle farming. The results identified a clear need for the relevant government institutions to take initiative and work more closely with the beef-cattle farmers. The study furthermore suggests that a more transparent communication is needed, together with a closer involvement of farmers in all stages of the programme.

The objective of the second article was to explore and discuss how Indonesian extension agents perceives the practical implementation of the programme, including their own and others' expectations of their role in the implementation, as well as in the programme. The study was based on semi-structured qualitative interviews with 14 extension agents in the Semarang Regency, Central Java Province, Indonesia. The extension agents experienced that there was no coherent support regarding how to implement policy toward the farmers, disseminate knowledge or assist farmers on how to increase production on their farms and how to balance this with other farm priorities. The practical framing and conditions for their work did not seem to match the expectations from either party – neither the farmers nor government.

The third paper aimed to assess the sustainability of smallholder beef-cattle farms in Indonesia, where there is a national goal to improve the country's beef self-sufficiency, and to explore and discuss potential improvement limitations and solutions. This paper presented a FAO SAFA (Sustainability Assessment of Food and Agriculture Systems) sustainability assessment of six family farms representing three types of family farming systems; first with only family labour; second with hired labour; and third with hired

labour and the farmers as a ”middleman in marketing system”. Individual structured interviews based on the SAFA guidelines were conducted. The results showed that the SAFA sustainability performance generally scored better in the farming system with relatively more resources and hired labour, and the household head also working as middleman, as compared to the other two farming systems with some or no hired labour. These results indicate that the larger room for sustainability improvement relies in the farming systems with only family labour. Lack of information, training and economic resources showed to be two main drivers that explain part of these differences. The results suggest that the government's role in increasing awareness, providing information and training and facilitating sustainable development practices is crucial to allow improvements.

The fourth paper aimed to understand what ”sustainability” means to farmers with regard to their daily practices, both before and after being confronted with the results of an assessment conducted on their farms. The study presented in this article was based on two FGDs, using the results of the SAFA online assessment as a tool to initiate and facilitate the discussions. The two group discussions were recorded using a digital voice recorder, transcribed in Transana software program. The interviewed farmers thought of sustainability in a day-to-day context rather than as a concept with greater and longer term implications on practices and implications. In their views, sustainability was very much about being able to continue farming, for the farm to survive and about being able to hand it over to the next generation. However, when presented with the four dimensions of the SAFA framework, they acknowledged the wider perspectives and different aspects of sustainability and reflected about how their own agricultural practices related to these wider aspects of sustainability.

The results showed that it is important to involve the smallholder beef-cattle farmers and understand their life situation before implementing policies. Preparation and coordination among government employees is needed before policies are implemented and transferred for farmers. The participatory approach, to create the enabling conditions for sustainable farming practices based on locally available resources and on local skills and knowledge, is emphasised. It was also suggested that the continuity of small family farms is a key point when discussing the sustainability of livestock farming systems. Improving productivity of smallholder farming system will also contribute to the local economy and food security. It was shown that the farmers' view of sustainability is related to their fundamental value

orientation. It was about being able to continue farming and the survival of the farm, e.g. the importance of having no diseases on their farm and about being able to hand the farm over to the next generation. Hence, it is important to put more efforts into promoting sustainable practices for farmers and their family. The importance of the empowerment process in order to improve the farmers' participation and leadership in the development was pointed out. The farmers' contribution means that they are not only able to take and adopt whatever the government offers to them but also to take ownership of the government's program and bring it into their own context.

It is possible to include participatory research and action research in the development of Indonesian beef-cattle farming systems in the future. The results of this thesis can be used as a first step to introduce and to motivate a sustainability concept - not only for actors in beef-cattle farming sector but also for Indonesian citizens. Interdisciplinary research is required to better understand the sustainability concept in the Indonesian beef-cattle farming system, e.g. a combination of social science and animal science as important components in the sustainable development of the livestock farming system.

Sammendrag (Danish)

Formålet med dette PhD studium var at undersøge og give indsigt i indonesiske oksekødsproducerende småbønders situation, med henblik på at kunne diskutere bæredygtighed af deres produktion, samt af implementeringen af det såkaldte Beef Self-Suffiency Program (BSSP; 'oksekøds-selvforsynings program'). Resultaterne af studiet er præsenteret i fire artikler, hvoraf den første artikel er publiceret.

Formålet med den første artikel var at undersøge hvordan indonesiske landmænd på smålandbrug opfattede deres egen kødkvægs produktion i relation til BSSP, med særligt fokus på hvordan de havde oplevet måden, hvorpå programmet var blevet implementeret. Studiet var baseret på 14 semi-strukturerede kvalitative interviews af kødkvægsproducenter på mindre landbrug i den centrale Javaregion i Indonesien. Resultaterne af studiet viste at landmændene i stor udstrækning ikke havde kendskab til den eksisterende nationale politik og dertilhørende 10-årige implementeringsprogram af selvforsyning af oksekød. Resultaterne pegede på et klart behov for et tættere og mere åbent samarbejde mellem på den ene side autoriterne, som implementerede disse politiske tiltag, og på den anden side kødkvægsproducenterne. Studiet pegede endvidere på at der var behov for en mere åben og transparent kommunikation i tillæg til en højere grad af involvering af landmændene i alle faser af implementeringen af BSSP programmet.

Formålet med den anden artikel, som var et interview-studie af rådgiverne ude på de lokale rådgivningskontorer, var at undersøge og diskutere hvordan de indonesiske statslige rådgivere opfattede den praktiske implementering af BSSP, samt deres egen og andres forventninger til deres rolle som rådgivere i implementeringen af programmet. Studiet blev gennemført som 14 strukturerede kvalitative interviews med statslige rådgivere fra Semarang regionen i den central Java provins. De statslige rådgivere gav udtryk for, at der ikke var nogen konsistente retningslinjer for fordeling af økonomiske midler, vidensdeling eller hvordan de kunne hjælpe landmændene med at øge deres produktion, samt endeligt hvordan dette kunne afbalanceres med andre prioriteter for det enkelte landbrug. Rådgiverene følte sig generelt klemt imellem regeringens forventninger til implementeringsindsatsen og effektiviteten, og på den anden side landmændenes forventninger til tilgængelighed, assistance og statsstøtte. De oplevede, at de praktiske

rammer og betingelser for deres arbejde ikke var i overensstemmelse med forventningerne, hverken fra landmændenes eller regeringens side.

Den tredje artikel havde til formål at vurdere bæredygtighed af den indonesiske kødkvægsproduktion på gårdniveau. Dette ville bringe det nationale mål om at forbedre landets selvforsyningsgrad af oksekød i perspektiv og skabe baggrund for at undersøge og diskutere løsninger, og potentielle begrænsninger i forhold til det overordnede mål. Tredje artikel anvendte FAO's web-baserede SAFA-ramme (Bæredygtighedsanalyse af fødevarer og landbrugs systemer) for at analysere aspekter af bærdygtighed af seks familie landbrug, som repræsenterende 3 forskellige former for familiebaserede landbrug. Den første type var baseret alene på familiens arbejdskraft, den anden type inkluderede ansatte, og den tredje type havde ansatte, og derudover havde landmanden job som mellemmand i marketingkæden. Individuelt strukturerede interviews med udgangspunkt i SAFA retningslinjerne blev gennemført. Resultaterne viste, at SAFA bærdygtigheds-vurderingen generelt var bedre for landbrug med relativt flere ressourcer og ansatte samt bibeskæftigelse i marketing, sammenlignet med de 2 øvrige typer som havde få eller ingen ansatte. Disse resultater indikerede, at behovet for forbedringer af bæredygtigheden af smålandbrug er størst i de rent familiebaserede landbrug. Manglende information, uddannelse og økonomiske ressourcer, viste sig at være de afgørende faktorer som forklarede forskellene mht. bæredygtighed mellem de tre typer landbrug. Resultaterne indikerer endvidere at regeringens rolle mht. at udbrede kendskabet til sådanne aspekter af bæredygtighed f.eks. ved at tilbyde uddannelse og træning og rådgive om bæredygtig praksis er altafgørende for at muliggøre forbedringer.

Den fjerde artikel havde til formål at undersøge hvad "bæredygtighed" betød for landmændenes daglige arbejdsgange. Den var baseret på to fokusgruppe-interviews, som tog udgangspunkt i præsentationen af SAFA bæredygtigheds-analysen af deres egne landbrug. De deltagende landmænd havde ikke tidligere været konfronteret med det bredere bæredygtigheds begreb, og betragtede og behandlede bæredygtighed på dag-til-dag basis. Fra landmændenes synspunkt handlede bæredygtighed i højere grad om at kunne fortsætte på deres bedrift, samt at kunne overdrage den til næste generation. Da de blev præsenteret for de fire dimensioner af SAFA, anderkendte de, de bredere perspektiver i og forskellige aspekter af bæredygtighed, og reflekterede over hvordan praksis på deres egen bedrift relaterede til disser aspekter.

Den samlede afhandling peger på behovet for at inddrage landmænd og forstå deres situation i enhver implementeringsproces af politiske programmer. En velkoordineret og forberedt proces mellem forskellige instanser indenfor regering og autoriteter bør gå forud for dette. Afhandlingen pegede også på en deltagerorienteret proces for at skabe det rette miljø og betingelser for udviklingen af bæredygtigt landbrug, baseret på lokalt tilgængelige ressourcer, viden og kvaliteter. Afhandlingens resultater peger på at det kan være relevant at foreslå at en øget produktivitet og bedre organisering af mindre kvægbrug kan bidrage til de lokale økonomi i området og dermed fødevaresikkerheden og bæredygtigheden. Afhandlingen viste, hvordan landmændenes forståelse af begrebet 'bæredygtighed' tog udgangspunkt i deres værdier, og at de primært forstod bæredygtighed som en umiddelbar evne til at kunne overleve på deres gård.

Afhandlingen pegede også på betydningen af 'empowerment' af landmændene såvel som rådgiverne, for at kunne transformere et program som BSSP ind i deres egen virkelighed og øge deres deltagelse og incitament til at tage situationen i egen hånd. Landmændenes bidrag og deltagelse betyder at de ikke bare 'modtager' men faktisk tager ejerskab over regeringens program og bringer det ind i deres egen kontekst.

I fremtidige perspektiver peger jeg på vigtigheden af at gennemføre studier for at kunne forbedre forskningsmetodologien, inkludere deltagerorienteret forskning og aktionsforskning i udviklingen af indonesisk oksekødproduktion fremover. Resultaterne kan også bruges til at motivere en bredere introduktion og diskussion af bæredygtighedsbegrebet til de indonesiske mindre kødkvægsproducenter, men også til borgerne bredt set, og indenfor andre sektorer. Interdisciplinær forskning er nødvendig for at kunne forstå bæredygtighedskonceptet i mange forskellige sammenhænge i det indonesiske kødkvægproduktionssystem, og det demonstreres at kombinationen af sociale videnskaber og husdyrvidenskab kan skabe en vigtig forståelse for bæredygtig udvikling af husdyrproduktionssystemer.

Kesimpulan (Indonesian)

Tujuan penelitian ini adalah untuk memberikan wawasan lebih dalam mengenai situasi peternak sapi potong di Indonesia, dan atas dasar ini bisa digunakan untuk membahas aspek keberlanjutan pertanian dan pelaksanaan kebijakan Program Swasembada Sapi Nasional. Hasil penelitian ini disajikan dalam empat makalah.

Tujuan dari makalah pertama adalah untuk mengethui lebih dalam kehidupan peternak sapi potong, khususnya ketika program swasembada sapi diimplementasikan. Penelitian ini didasarkan pada 14 wawancara kualitatif dengan petani sapi potong di Propinsi Jawa Tengah, Indonesia. Studi ini menunjukkan bahwa petani sebagian besar tidak menyadari kebijakan pemerintah yang sedang di implementasikan. Hasil penelitian mengidentifikasi perlu adanya peningkatan peran pemerintah untuk mengambil inisiatif dan mengutamakan kebutuhan peternak. Dibutuhkan tekhnik komunikasi yang sesuai dengan kebutuhan peternak, dan berupaya untuk meningkatkan keterlibatan peternak di semua tahapan program pembangunan.

Makalah kedua bertujuan untuk memahami peran penyuluh di Indonesia berkontribusi dalam implementasi program pemerintah untuk swasembada daging sapi nasional. Penelitian ini adalah penelitian kualitative dengan 14 penyuluh di Kabupaten Semarang, Provinsi Jawa Tengah, Indonesia. Para penyuluh menyadari bahwa kurangnya dukungan dari pemerintah terhadap kegiatan penyuluhan termasuk kurangnya sarana dan prasarana untuk mendukung tugas penyuluh ketika berkomunikasi dengan peternak. Dalam hal ini penyuluh mebutuhkan kerjasama tidak hanya lokal pemerintah tetapi juga dengan institusi terkait dalam peningkatan kegiatan penyuluhan. Peran pemerintah juga sangat besar untuk meningkatan peran penyuluh, misalnya peningkatan pelatihan dan perbaikan sarana dan prasarana.

Tujuan dari makalah yang ketiga adalah untuk menerapkan sustainable assessment di peternak sapi poting di Kabupaten Semarang, Jawa Tengah, Indonesia menggunakan SAFA assessment (Sustainability Assessment of Food and Agriculture Systems) yang dikembangkan oleh FAO. Penelitian ini bermanfaat untuk mengetahui kelemahan dan solusi pembangunan peternakan sapi potong di Indonesia sehingga bisa bermanfaat demi keberlanjutan pembangunan peternakan di kemudian hari. Penelitian ini berdasarkan penilaian keberlanjutan pembanguna peternakan menggunakan SAFA assessment di enam

peternak yang diteliti. Hasil penelitian menunjukkan bahwa peternak dengan sumber daya serta sumber dana yang baik dan terprogram memiliki kinerja lebih baik dengan analisis SAFA assessment. Hal ini bisa di katakan bahwa peternak kecil dengan sumber dana yang kecil dan minim pengetahuan cara beternak harus di upayakan ditingkatkan kinerjanya. Hasil penelitian menunjukkan bahwa peran pemerintah dalam meningkatkan kesadaran, memberikan informasi dan pelatihan dan memfasilitasi latihan dengan cara yang lebih baik dan berkelanjutan sangat penting untuk memungkinkan perbaikan dan peningkatan pembangunan peternakan tanpa mempengaruhi akan dampak lingkungan.

Tujuan makalah yang ke empat adalah memahami arti keberlanjutan pembangunan peternakan (sustainability) bagi peternak sapi potong. Penelitian ini menggunakan metoda Focus Group Discussion (FGD) dengan membawa hasil SAFA assessment untuk memulai dan memfasilitasi diskusi. Peternak memiliki pendapat sendiri tentang makna dari keberlanjutan peternakan. Pendapat peternakan berhubungan dengan konteks dan kondisi peternak sehari-hari dalam menjalankan usahanya dan bukan sebagai sebuah konsep jangka panjang. Menurut pendapat peternak, keberlanjutan peternakan adalah mampu bertahan sebagai peternak, tidak mengalami kerugian usaha beternak dan mampu menyerahkan usaha ternak kepada generasi berikutnya. Peternakan juga menyadari bahwa mereka sudah menjalankan kegiatan atau tekhnik beternak yang bisa bermanfaat jangka panjang untuk pembanguna peternakan. Walaupun pemerintah harus berupaya untuk mengenalkan cara beternak yang lebih baik

Pembahasan tesis disarankan pemahaman petani situasi kehidupan sebelum menerapkan kebijakan. Nah mempersiapkan dan koordinasi antar pegawai pemerintah diperlukan sebelum kebijakan dilaksanakan dan ditransfer untuk petani. Tesis juga menekankan pendekatan partisipatif untuk menciptakan kondisi yang kondusif bagi praktik pertanian berkelanjutan berdasarkan sumber daya yang tersedia secara lokal dan keterampilan dan pengetahuan lokal. Diskusi tesis juga menunjukkan tentang kelangsungan peternakan keluarga kecil adalah titik kunci ketika membahas keberlanjutan sistem peternakan. Meningkatkan produktivitas usahatani petani juga akan berkontribusi pada perekonomian dan ketahanan pangan lokal. Tesis mengakibatkan pandangan cara petani keberlanjutan terkait dengan orientasi nilai fundamental mereka dalam sistem pertanian. Itu tentang mampu melanjutkan pertanian, kelangsungan hidup pertanian, misalnya pentingnya ada kematian sapi atau penyakit berbahaya di pertanian mereka, dan tentang mampu menyerahkan pertanian ke generasi berikutnya. Oleh karena itu, penting untuk

menempatkan lebih banyak upaya untuk mempromosikan praktek-praktek berkelanjutan bagi petani dan keluarga mereka. Tesis juga menunjukkan pentingnya proses pemberdayaan untuk meningkatkan partisipasi dalam dan kepemimpinan petani dalam pengembangan. Kontribusi petani berarti bahwa mereka tidak hanya mampu untuk mengambil dan mengadopsi apa pun pemerintah menawarkan kepada mereka, tetapi juga mengambil kepemilikan dari program pemerintah dan membawanya ke dalam konteks mereka sendiri.

Perspektif masa depan, saya menyarankan kemungkinan untuk melakukan studi untuk meningkatkan penelitian metodologis. Ada kemungkinan termasuk penelitian partisipatif dan penelitian tindakan dalam pengembangan sistem pertanian sapi potong Indonesia di masa depan. Hasil tesis juga dapat digunakan sebagai langkah untuk memperkenalkan dan memotivasi untuk menyampaikan konsep berkelanjutan tidak hanya bagi pelaku di sapi pertanian tetapi juga untuk warga negara Indonesia, misalnya kemungkinan untuk melakukan penelitian lebih lanjut tentang persepsi sosial keberlanjutan antara warga negara Indonesia untuk mempromosikan konsep keberlanjutan tidak hanya untuk sektor sapi tetapi juga sektor lainnya. Penelitian interdisipliner diperlukan untuk lebih memahami konsep keberlanjutan dalam sistem pertanian sapi potong Indonesia, misalnya kombinasi ilmu sosial dan ilmu hewan sebagai komponen penting dalam pembangunan berkelanjutan dari sistem peternakan.

List of Included Papers

Paper 1
The implementation of Indonesia's beef self-sufficiency programme (BSSP) as seen from a farmer family perspective
Siwi Gayatri and Mette Vaarst
The Journal of Rural and Community Development, 10(2), pp. 166-186, published

Paper 2
Bridging Expectations: "Extension Agents' Perception of a Gap between Expectations and Experience when Implementing the Indonesian Beef Self-Sufficiency Programme"
The International Journal of Agricultural Extension, submitted

Paper 3
Assessing Sustainability of Smallholder Beef Cattle Farming in Indonesia: A case study using the FAO SAFA Framework
The Journal of Agronomy and Sustainable Development, planned

Paper 4
Indonesian Smallholder Beef Producers' Perception of Sustainability and Their Reactions to the Results of an Assessment Using the Sustainability Assessment of Food and Agriculture System developed by the UN FAO – A Case study Based on Focus Group Discussions
The Journal of Rural and Community Development, submitted.

1. Introduction

1.1. The Indonesian Beef Cattle Farming Situation

Beef cattle farming in Indonesia is very important for the national food security, nutrition, income, and savings, and it has both a social and a cultural function for the farmers (Hadi et al., 2002). The production of beef cattle is predominantly performed by smallholder farms, and according to Vanzetti et al. (2010), most of the smallholder farmers have three to four cows in average, and most farmers have little or no prior experience in livestock education. The demand for beef products in Indonesia has increased from 2.15 kg/person/year in the 1990s to 2.69 kg/person/year in the 2000s (Fabiosa, 2005; Setianto, 2014a) due to population growth, increasing urbanization, and the tendency to spend money on food (Permani, 2011). There has also been a shift in the consumption patterns in Indonesia with a decreasing consumption of rice as the staple food and an increasing consumption of animal-protein products (Fabiosa, 2005). However, the domestic supply of beef products has never been able to meet the nation's demand. Indonesia has therefore imported 40 % of its national consumption of beef since 1999 (Tseuoa et. al., 2012).

The Indonesian government launched a *Program Swasembada Daging Sapi (PSDS)* or the Beef Self-Sufficiency Program (BSSP) in 2005. The aim was to reduce imports of beef cattle by 10 % of total demand by 2009 and to achieve long-term food security based on local cattle to meet the increasing population's demand for beef products. This target was not achieved by 2009, and the BSSP was therefore extended to 2014 (the governmental regulation of the Indonesian Department of Agriculture no. 19, 2010). In line with this program's objective, the Indonesian government launched several programs to accelerate the increase in the national herd with the objective of achieving 90 % self-sufficiency in beef in 2014 such as: *Kredit Usaha Pembibitan Sapi, KUPS* (Credit for Cattle Breeding); *Sarjana Membangun Desa, SMD* (Graduates Support Farmers); and *Lembaga Mandiri yang Mengakar di Masyarakat, LM3* (Independent Community-Based Institutions) (Setianto et al, 2014b). Although the sub-programs (KUPS, SMD, LM3) have been implemented by the Ministry of Agriculture to support the BSSP, Indonesia remains dependent on imports to supply its national beef demand. This indicates that these programs did not perform as expected, and there must be some problematic situations which constrain the development of smallholder beef farming in Indonesia (Setianto, 2014).

1.2. Indonesian Smallholder Beef Cattle Farming and Sustainability

Permani (2013) revealed several challenges problems restricting further improvement of Indonesia's beef cattle productivity. These challenges included limited farmer education, poor management practices, scarcity of forage during the dry season, high prices of beef cattle feed, limited access to bank loans, limited access to high-quality genetics, and the conversion of agricultural land for housing, businesses, and industry which may affect the quality of pasture and feed resources. Furthermore, about 90 % of beef cattle in Indonesia are owned by 6.5 million rural households with a low educational background in livestock (Hadi et al., 2002). Vancetti et al. (2010) also mentioned that the breeding management remains insufficient.

This might be some of the reason why Indonesia is heavily dependent on imported cattle despite the commitment to food security. The number of cattle imported per year continues to grow (Hadi et al., 2002). Therefore, Indonesia remains a potential market for any exporting countries. The commitment to be independent from imported cattle has led the Indonesian government to set a self-sufficiency target. This leads to an important consideration: how can this target contribute to the sustainability of the Indonesian beef cattle sector and what can the Indonesian smallholder beef cattle farmers do to contribute to this national program. The sustainability agenda becomes more and more urgent and apparent on different levels, from sector level to global level, like for example highlighted in the recently developed ''Sustainable development goals'' (UN, 2015). Considering sustainability is also important on farming system levels, because all the choices we pursue and all the actions that we make today will affect everything in the future (Morse et al, 2001). We need to make sound decisions at the present time at all levels, e.g. from farming to consumption, to avoid limiting the choices of generations to come. Assessing sustainability is a complex process where environmental and economic aspects, social and ethical considerations, and good governance must be taken into account. In order to develop more sustainable farming systems, all actors in the system need to collaborate to answer important questions like (Bell and Morse, 2008): what are the relationships between the various elements of sustainability, what should and can be measured, and how are the results to be interpreted so that farmers can improve their productivity, what kind of practices improve sustainability, which channels can best facilitate the dissemination and adoption of practices in different conditions, and at what cost and benefit. However, it is important to recognize that running farming systems requires a high level of farmer

skills and management (Nemecek et al., 2011). It is also important to point out that *"reaching toward the goal of* sustainable *agriculture is the responsibility of all participants in the agricultural system",* including farmers, laborers, policymakers, extension agents, researchers, retailers, and consumers (FAO, 2011a). Each group has its own part to play, its own unique contribution to make, in order to strengthen the sustainable agricultural community. It is my hope that the results from this thesis may form the basis for the decisions that policymakers and other stakeholders need to make to improve sustainability in Indonesian beef cattle farming. This thesis investigates the implementation of a policy in Indonesia that seeks to achieve self-sufficiency, seen from farmers' and extension agents' perspectives. Understanding the conditions and perspectives of the farmers and government employees as part of the policy implementation process could potentially facilitate a more creative and ultimately a more effective response, particularly to improve the implementation of the policy.

The thesis will examine perspectives and conditions in the field of smallholder farming system in Indonesia as perceived by farmers and extension agents, based on qualitative interviews in cases of smallholder farming communities in Semareng Regency. To understand the actors' experiences, their perception, attitude, learning point, and ways of thinking; it challenged me very much to understand, particularly how can farmers and extension agents contribute to a development of smallholder beef cattle farming in Indonesia which takes several aspects of sustainability into consideration?. This thesis opens the topic of how the concept of sustainability can be understood and assessed in the context of Indonesian smallholder beef cattle farming. Results of a sustainability assessment using the FAO-based assessment framework SAFA (FAO, 2013) will be explored and discussed in this thesis. I found it important to discuss aspects of sustainability among Indonesian smallholder beef cattle farmers to understand how they see sustainability. As a part of the SAFA assessment, farmers' reaction to the assessment and their understanding and articulation of what potentially constitute "sustainable farming practices" were explored in focus group interviews. Farmers were confronted with definitions which they may never have heard or considered before. This is to explore and enable a discussion about potential improvements, limitations, and solutions for smallholder beef cattle farmers, in the context of their expected contribution to a national goal to improve the country's beef self-sufficiency. I found that this was important knowledge to include in the debate of self-sufficiency in sustainable farming practices.

1.3 Process of Developing the Study

My interest in the area of sustainable beef cattle production in Indonesia started with the news of increasing meat prices in Indonesia. In 2010, it came to my knowledge that the Indonesian government failed to achieve self-sufficiency (the BSSP) in 2009. Hence, the government launched a new goal, i.e. to achieve a new self-sufficiency goal in 2014. In this period, Indonesian dependency on imported cattle was high. For me as consumer, the rising costs of beef meat had actually caused me to switch to alternative meat sources such as chicken or fish.

This made me think about the conditions of beef cattle farming in Indonesia. It was dominated by smallholder farmer families with three or heads of cattle. The cows were the farmers' savings, as they could easily be converted into cash whenever the farmers needed it. My opinion was supported by the story about my grandparents who sold their two cows in order to send my father to university. I remembered that my grandparents and their neighbors, who also owned a number of cows, faced the same problems due to poor management of the farming system because of lack of knowledge about cattle production. On the other hand, the smallholder farmers like my grandparents wanted to increase the number of cows and improve the farming management despite their limited resources.

Several studies have been conducted to support the development of beef cattle farming in Indonesia. These include the works by Poppi (2011) and Permani (2013). Poppi et al. (2011) focused heavily on the technical aspects of production as indicated by the main focus of their recommendations which were improvements in the production technology. Permani (2013) highlighted the importance of cost-benefit analysis of the government's approach that import quotas would have long-term impacts on the relative domestic price.

Many questions came to my mind, e.g. how are the actual conditions of the beef cattle farmers, how can the government support the farmers to improve productivity, and how can the government policy such as the self-sufficiency program benefit the smallholder farmers. Moreover, I become aware of the idea of sustainable development, i.e. development through the integration of all dimensions of sustainability that meet the needs of the present generations without compromising the ability of future generations to meet their own needs. In my opinion, the sustainability term is a new approach to the development of the agricultural sector in Indonesia. However, it is very rare to find literature or articles about sustainable agriculture in Indonesia. I knew that I had to 'do something' to give back to my country and to explore the sustainability of beef cattle

farming in Indonesia, Therefore, I decided to focus on the sustainability of smallholder beef cattle farming in Indonesia. The title of my PhD study ”Aspects Of Sustainability Of Smallholder Beef Cattle Farming In Indonesia” has challenged me, because it expresses a basic interest of mine which is to get to know and understand what is going on in the field of smallholder beef cattle farming in Indonesia. I hope this thesis will contribute to the development of sustainable agriculture of smallholder beef cattle farming in Indonesia.

1.4 Strategy for my Research Process

In the beginning of my PhD, I studied different research methodologies, including qualitative research methods. This enabled me to identify an area of focus which previously had been largely overlooked related with the implementation of the BSSP, e.g. explored people' perception and opening up for topic which could be sensitive. It gave me a deep understanding of what qualitative research methods are and introduced me to the theory and practice of qualitative research. It has guided me to construct my research process. Combined with my knowledge of animal science, I decided that qualitative research was the appropriate research methodology to achieve the objective of my thesis. The study was conducted in Semarang regency, Central Java Province, Indonesia, while analysis of data and the writing part were carried out at the Department of Animal Science, Faculty of Science and Technology, Aarhus University. It has been a challenging and interesting ”journey” for me to share my work between Indonesia and Denmark. I have been both challenged and fascinated by the complexity of the process from the start of the PhD study, data gathering, analyzing data, and until the process of writing the thesis. I have enjoyed doing research within the field of animal science and social science – especially the qualitative research.

2. Objectives and Outline of the Thesis

2.1. Objectives of the Thesis

The overall objective of this thesis entitled "**Aspects of Sustainability of Smallholder Beef Cattle Farming in Semarang Regency, Central Java Province, Indonesia**" is to provide insight into the situation of smallholder beef cattle farming in Indonesia and on basis of this to discuss aspects of sustainability and the implementation of the policy of the so-called Beef Self-Sufficiency Program (BSSP). To achieve this overall aims, two intermediary objectives guide the research and lead to the answers research questions (see Figure 1 below) showing the research framing of this thesis.

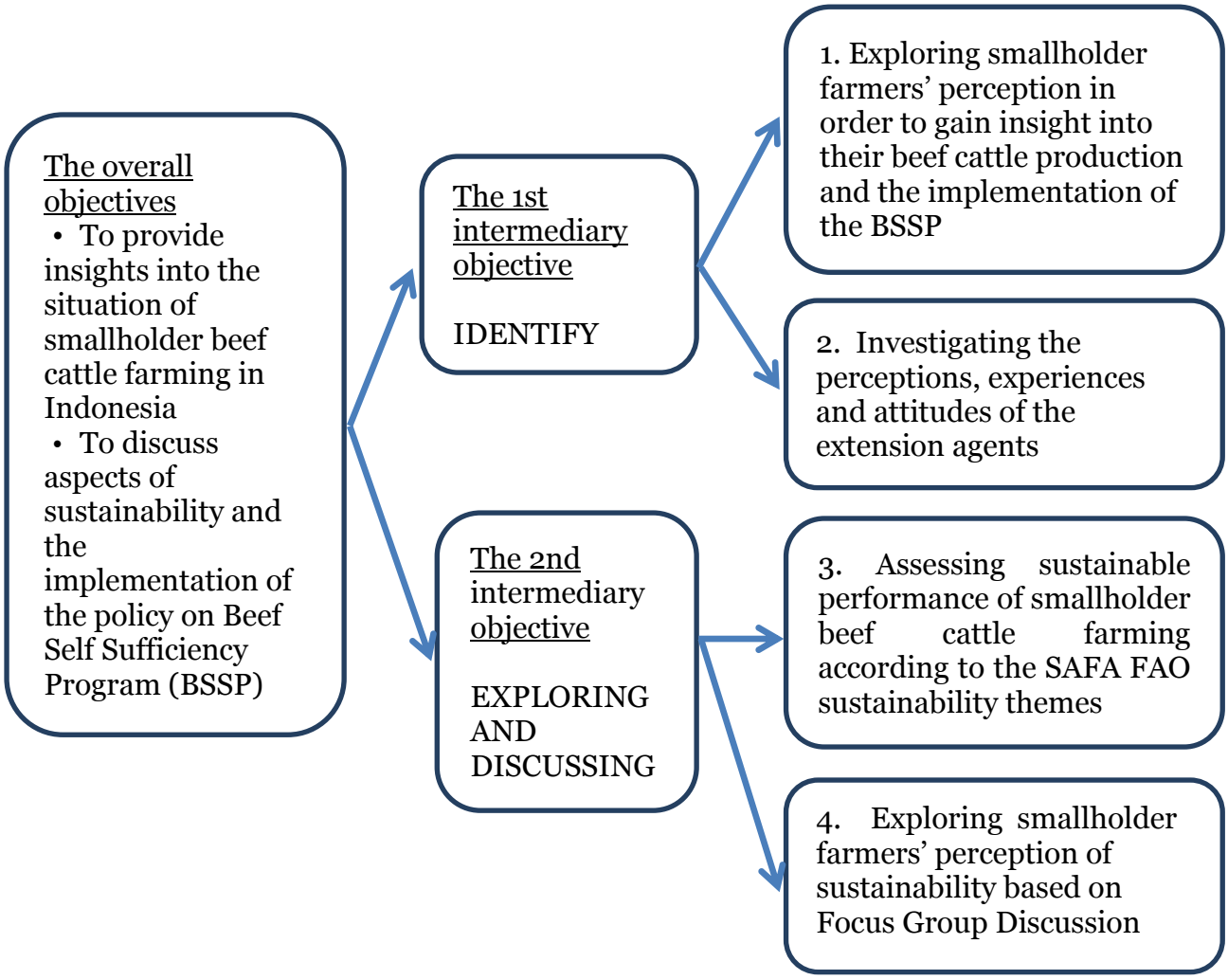

Figure1. The research framework. The results of the thesis are presented as four papers investigating the two specific objectives of the thesis: The first paper evaluates the smallholders farmers' perception on beef cattle production and the implementation of the current policy, the second paper evaluates the extension agents' perception, the third paper is about the SAFA assessment, and the fourth paper evaluates the smallholders farmers' perception of sustainability.

The two intermediary objectives and their related research questions and research approaches of investigating these objectives are given below:

1) To identify the situation of Indonesian smallholder beef cattle farming in the field.

The following research approaches were used to achieve this:

a. Exploration of smallholder farmers' perceptions as case studies in two districts in the Semarang Regency, Central Java Province in order to gain insight into their beef cattle production and the implementation of the BSSP in Indonesia (Section 5.1).
b. Investigation of the perceptions and attitudes of the extension agents regarding the implementation of the BSSP in the Semarang Regency, the perception of the extension agents' their own role and working conditions, and discussion of how the extension agents can bridge the expectations of the farmers and the government that originally launched the BSSP (Section 5.2).

2) To explore and discuss aspects of sustainability in the context of Indonesian smallholder farming in line with the government policy for self-sufficiency. This addressed the research question 3: "How can the use of the SAFA assessment and FGD stimulate the discussion and understanding of sustainability among Indonesian smallholder beef cattle farmers?"

This objective was address through the following studies:

a. Use of the so-called SAFA framework developed by FAO to assess the sustainability performance of three different types of smallholder beef cattle farming in two districts in the Semarang Region (Section 5.3).
b. Exploration of smallholder farmers' perception of sustainability based on the results of the above mentioned SAFA assessment which was presented to the farmers using Focus Group Discussions (FGDs) (Section 5.4).

Hence, the study addressed three research questions:

1. How do Indonesian smallholder farmers perceive their own beef cattle production and the current policy with particular focus on the way it was implemented?
2. What are the perceptions, experiences and attitudes of the Indonesian extension agents regarding their own role in the implementation of BSSP?
3. How can the use of the SAFA assessment and FGD stimulate the discussion and understanding of sustainability among Indonesian smallholder beef cattle farmers?

2.1. Outline of the Thesis

The thesis consists of eight chapters. Chapter 1 began with the introduction of thesis. The introduction section consists of a section about the Indonesian beef cattle farming situation, the Indonesian smallholder beef cattle farming and sustainability, the process of developing the study, and the strategy for the research process. It was followed by the objectives of the PhD thesis (Chapter 2). State of art is presented in Chapter 3. It gives an overview of relevant information and literature as a background for the objectives and research questions in the thesis. Chapter 3 consists of two sections. First, the situation in the Indonesian beef cattle sector and the Indonesian Beef Self-sufficiency Program (BSSP) is emphasized. Second, sustainability definitions, sustainability assessment, and sustainable agriculture in an Indonesian context are addressed. Methodologies are discussed in the following chapter (Chapter 4). This chapter will present the use of the methods in the thesis, including reflections on methodologies and the combination of methodologies. After this, the results of the thesis are presented as four sections/papers investigating the specific objectives of the thesis (Chapter 5). The first paper evaluates the smallholders' perception on beef cattle production and the implementation of the current policy (Section 5.1), the second paper evaluates the extension agents' perception (Section 5.2), the third paper is about the SAFA assessment (Section 5.3), and the fourth paper evaluates the smallholders' perception on sustainability (Section 5.4). This will lead to a general discussion, conclusion, and perspectives. In the general discussion (Chapter 6), I will discuss the issues mentioned in the objectives, across all the four papers. I will examine how the PhD thesis takes a cross disciplinary approach in using social sciences to contribute to a field which is very relevant for animal scientific studies, including discussion of the results in relation to the concepts of sustainability in Indonesian beef

cattle farming system. Finally, an overall conclusion of the thesis is presented (Chapter 7), and further perspectives are discussed (Chapter 8).

3. State of the Art

3.1. The Setting

3.1.1. The Indonesian Beef Cattle Sector

Indonesia has the fifth largest population in the world with more than 250 million people, and the growth of the GDP (Gross Domestic Product) is more than 5 % per year (http://databank.worldbank.org, 2015). However, the Indonesian beef consumption is still low compared with other Asian countries (Fabiosa, 2005). At the same time, Indonesian beef consumption per capita rises every year, particularly due to an increasing population, urbanization, and the expanding middle class (Vancetti et al., 2010). The beef cattle population in Indonesia has been increased to more than 10 million heads of cows in 2010 (Fig. 2). In order to meet national demand, the Indonesian government imports cattle meat and live beef cattle from other countries – mainly Australia (Permani, 2013). A report by Hadi et al. (2002) shows that the Indonesian dependency on beef cattle import to supply domestic demand has increased from 1999 to 2014 (Fig. 3). The imported live beef cattle are for breeding purposes or for fattening and later slaughtering, the latter being the main purpose of importing live beef cattle.

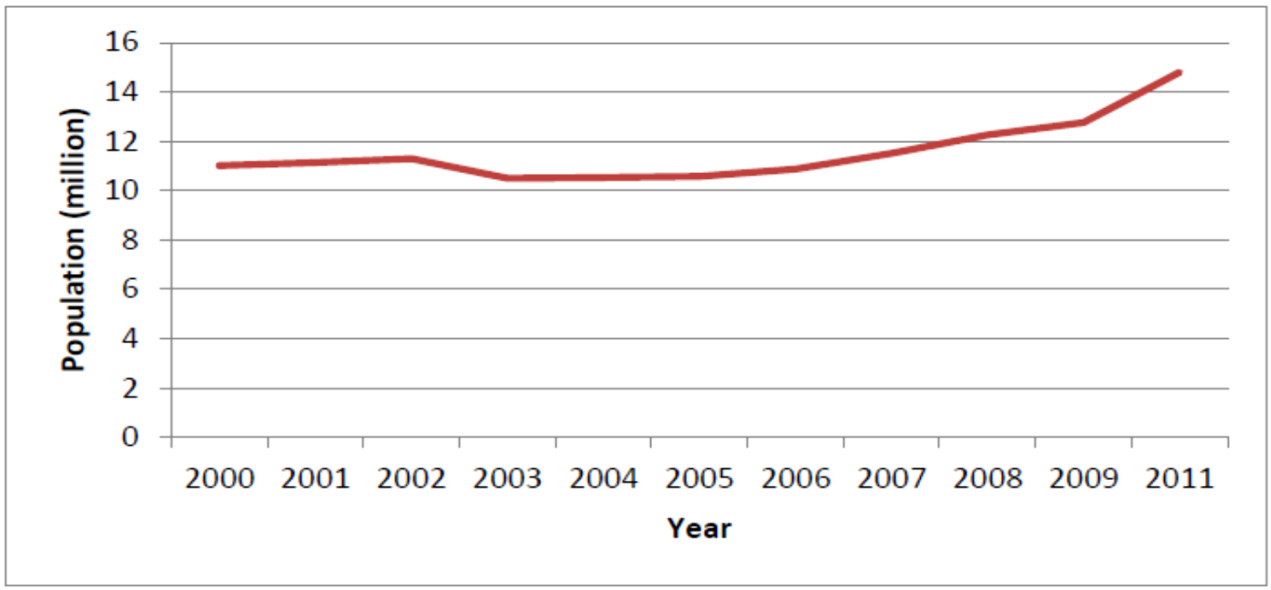

Figure 2. Local Indonesian beef cattle stocks
(Setianto, 2014;Directorate General of Livestock and Animal Health Services, 2015)

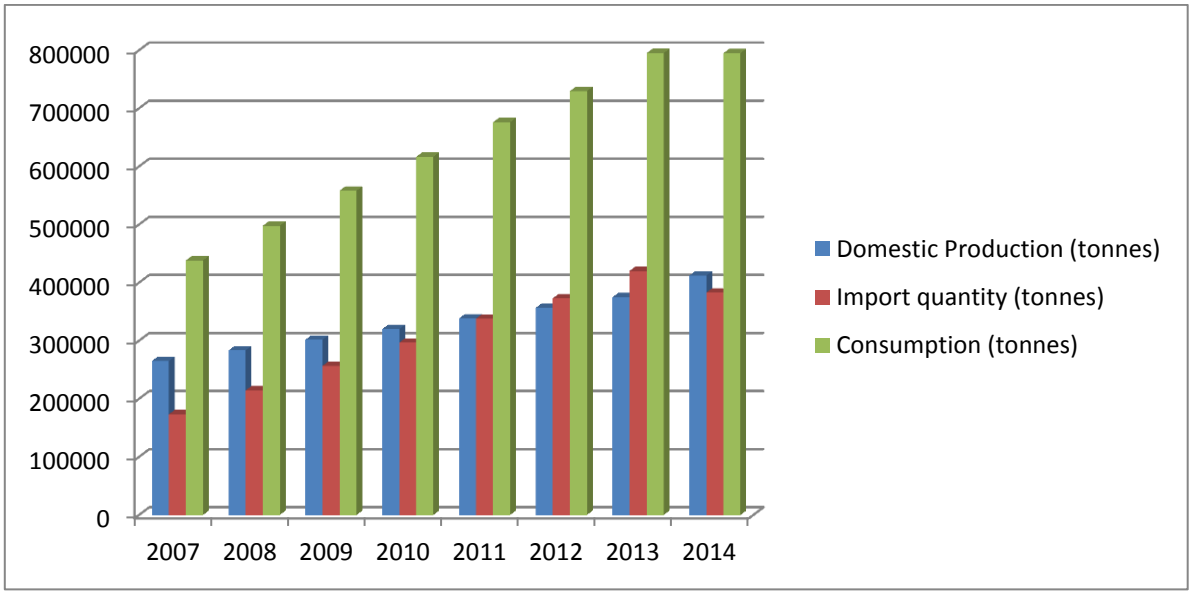

Figure 3. Indonesian domestic production and import quantity
(Directorate General of Livestock and Animal Health Services, 2015)

Beef cattle farming in Indonesia is not evenly spread out between all provinces of the country where the production is centered in Java Island, South Sulawesi, West Nusa Tenggara, and Bali (Indonesian Statistical Bureau, 2013). The distribution of beef production is influenced by population density and consumer location. Good slaughter houses are usually located near the big cities. The dominating beef cattle breed used is the local beef cattle *Peranakan Ongole* (Ongole) which was introduced from India during the Dutch colonization and accounts for 44 % and is used for both breeding and fattening system (Widi et al., 2015). Other breeds are Madura (25 %), Bali (9 %), and a variety of crosses (22 %) – primarily between Ongole and Simmental, Limousin and Brahman (Hadi et al., 2002).

At least several actors play an important role in shaping the beef industry in Indonesia: smallholder producers, commercial feedlots, processors or slaughterhouses, cattle transport services, traders, and consumers (Hadi et al., 2002). The behavior of these actors will determine the future of national beef production. The nature of recent Indonesian beef cattle farming is characterized by the very considerable gap between large-scale and smallholder farmers in Indonesia. Large farmers – the agribusiness companies – prefer to focus on the downstream end of the industry only, i.e. importing and trading, simply because these activities have a fast turnover and a lower risk. The upstream

activities with a very limited margin – breeding and fattening – are mostly dominated by smallholders (Setianto, 2014).

The beef cattle farming system is integrated with intensive crop production where crop residues and by-products are the major sources of cattle feed, while the cattle still provide draught power and manure for cropping (Priyanti et al., 2012; Fig. 4). The most commonly used feeds are agricultural by-products such as rice straw, maize stover, mung bean and peanut stover, sugarcane tops, and local leaves. These feeds are obtained from the farmers' own land or purchased from other farms. Other feed sources such as rice bran, molasses, tofu waste, and cassava are also fed to the cattle (Priyanti et al., 2012). Fresh forage and rice straw are collected every day from the surrounding area. Occasionally, farmers add supplements such as rice bran, *onggok (*by-product of cassava starch processing*),* and/or wheat pollard. Farmers have already cultivated grass (mainly *Pennisetum purpureum*/elephant grass) as the source of forage (Fig. 5). However, the amount grown is far from sufficient to support the daily forage demand. In many parts of Indonesia, smallholder farmers traditionally feed their cattle using cut and carry systems (Hadi et al. 2002; Hanifah et al, 2010; Fig. 6). The farmers also cut the native forage that is available in the village surroundings (Setianto, 2014; Fig. 6).

Figure 4. Paddy field in Semarang Regency. This is a mixed crop-livestock farming system using dry rice straw as forage for the cattle. The straw is collected shortly after paddy harvesting, carried, and stored close to the cattle shelters. (Photo: Siwi Gayatri)

Figure 5. Quality forages have also been developed, mainly *Pennisetum purpureum*. (Photo: Siwi Gayatri)

Figure 6. A farmer collecting fresh forage that is available in the village surroundings as one of the feed components for his cows.

In relation to the marketing of local beef cattle in Indonesia, a survey by Hadi et al. (2002) revealed that several categories of marketing channels are involved in the marketing of live domestic cattle (Fig. 7). The first is the smallholder farmers that will sell their cows to the cattle fatteners and cattle traders (*blantik*). The price of live cattle is determined by the physical condition of the cows (with weight measured by a guess from

the buyer ("*blantik"*) rather than by scales). The Farmer and *blantik* will bargain until a price is agreed. The *blantik* will take the live cattle into the cattle market places (*Pasar Hewan*). Cattle traders are classified into village traders, interdistrict traders, and interprovincial (or inter-island) traders. Cattle can also be move between subdistricts, districts, provinces, and islands. The last step in the marketing channels is the beef wholesaler. The wholesalers sell the beef to retailers at traditional markets, supermarkets, and meat shops.

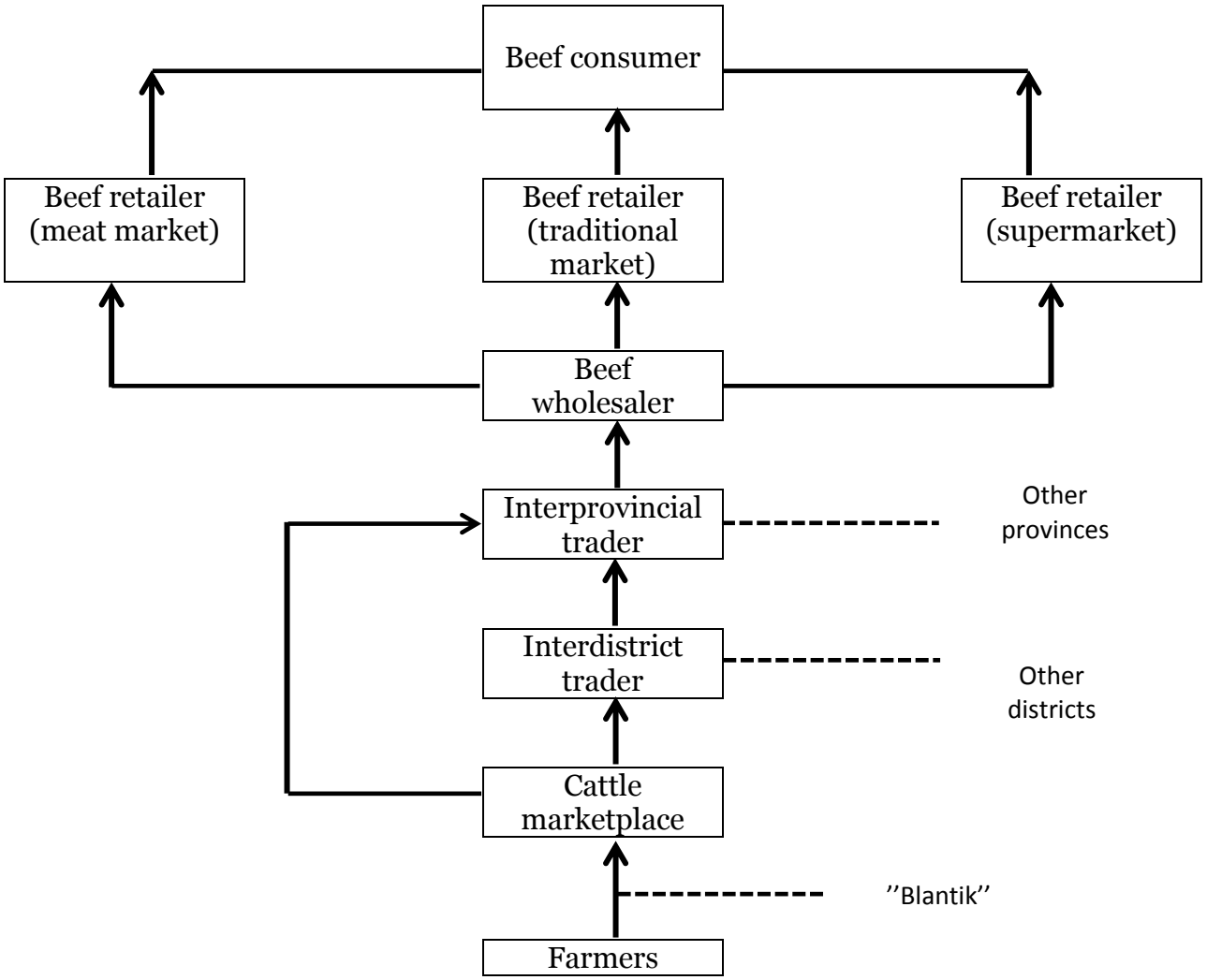

Figure 7. Marketing channels of the Indonesian local beef cattle (Hadi et al., 2002)

3.1.2. The Indonesian Beef Self-sufficiency Program (BSSP)

The concept of self-sufficiency has been a focus of the Indonesian government during the past few decades. In 2005, the Indonesian government via the Ministry of Agriculture announced the country's commitment to achieve self-sufficiency in beef by 2009. In early 2010, the Minister of Agriculture announced postponement of the deadline to 2014 (Permani, 2011). The concept of beef self-sufficiency was defined as a condition in which at least 90 % of domestic demand for meat is met by domestic production (Vancetti et al., 2010). Self-sufficiency required a sufficient domestic food production capacity to meet domestic demand. The Indonesian government promoted this national beef self-sufficiency program in response to the growing population and rising per capita demand for beef – the latter being due to the rapid growth of the urban middle-class economy. Indonesia clearly stated a desire to achieve long-term self-sufficiency by producing enough local cattle to meet the demand. The program sought to increase the numbers and productivity of the domestic beef cattle. It was expected to rely on continuing the domestic cattle production system in Indonesia with significant implications for small-scale producers and to improve the marketing scheme (Kusriatmi et al., 2014).

The concept of self-sufficiency is closely related to food security, but the two terms differ. According to the government of the Republic of Indonesia, regulation (*Peraturan Pemerintah*) no. 68, 2002, food security is a food-sufficient condition for households determined by the availability of adequate food in terms of quantity, quality, safety, equality in term of access to get food, and affordability (Permani, 2013). Food supply can come from either domestic production or other sources. The BSSP, on the other hand, defined self-sufficiency as a condition in which at least 90 % of domestic demand for beef is met by domestic production (Ilham, 2006). Hence, while food security emphasizes the importance of access to food, self-sufficiency requires a sufficient domestic food production capacity to meet domestic demands. In other words, self-sufficiency is an important but not a necessary condition to achieve food security. However, with increasing international dependence, the sufficiency of local supply is not only determined by local production but is also affected by the world market and government policies on trade (Kusriatmi et al., 2014).

Achieving self-sufficiency through improved productivity is ideal but challenging. There are several technical constraints within the livestock sectors across Asian countries such as limited land, animal disease, a shortage of skilled labors and resources to manage

the farms, the lack of investments, the lack of supporting industries (e.g. better conditions in slaughterhouses), and transportation and marketing of livestock (Davendra, 2007). Indonesia deals with similar issues. Hence, the Indonesian government had initiated a number of livestock development programs in order to improve productivity such as setting import quotas, feed subsidies, easy access to credit, etc. (Hadi et al., 2002). Hadi et al. (2002) also concluded that any livestock development strategy undertaken by the government should: (i) improve the incomes of smallholder producers, (ii) encourage a sustainable and efficient domestic production capacity, and (iii) satisfy the growing demands of Indonesia's consumers for beef in ways that improve the overall performance of the economy. Moreover, Kusriatmi et al., (2014) mentioned that these development programs were also initiated during the implementation of BSSP. The implementation of BSSP can be generally divided into two broad categories: trade and productivity improvement. One of operational steps in BSSP was setting stock regulation on live beef cattle and beef meat through setting import quotas. This policy aimed to reduce beef imports with the hope of encouraging the growth of beef production and value added of local livestock subsector, creating job opportunities, and saving foreign exchange. Currently, the volume of beef import in a certain year is jointly determined by the Ministry of Agriculture and the Ministry of Trade. Indonesia remains a potential market for any exporting countries, e.g. the live cattle trade between Australia and Indonesia is worth nearly USD 400 million per annum. Over 50 % of Australian cattle farmers in the Northern Territory rely on exports to Indonesia. On the other hand, Indonesia's high dependency on imported live cattle suggests the potential of inflation due to shortage of supply – especially the high demand in the festive seasons of the Islamic calendar (75 % of the Indonesian population are muslim) (Permani, 2013). Therefore, any decisions in import policy will affect the beef local sector, e.g. meat price in consumer level. Hence, the government should consider deciding any policy to meet the national demand of beef cattle.

3.2. Sustainability Definitions and Sustainability Assessment

3.2.1. Sustainability

The concept of sustainability has been much discussed and debated in many areas. The concept is defined and used in different ways and meanings. Bell and Morse (1999)

mentioned that sustainable development was a very dominant theme at the time where their work was published, especially for the slogans of developmental and environmental activists.

The confusion over the meaning of sustainability is also apparent in other areas, for example when talking about "sustainable agriculture". Even though the definitions and descriptions of sustainability continue to increase, all the concepts of sustainability are based on the idea of the Brundtland report by the World Commission on Environment and Development (WCED) (1987) which says that the access for future generation to and over resources should not be blocked. WCED popularized the term ”sustainable development”. The first definition of sustainable development was developed by WCED: *”is development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations”* (WCED, 1987). Other definitions of sustainable development are:

> *”The capacity of a system to maintain output at a level approximately equal to or greater than its average, with minimizing the input for long term period”* (Lynam and Herdt, 1989).

> *”Maximizing the net benefits of economic, social, and cultural development, practices to maintaining the services and quality of natural resources over time”* (Pearce and Turner, 1990).

> *”The sustainability of natural ecosystems can be defined as the dynamic equilibrium between natural inputs and outputs, modified by the ability to deal with external events such as climatic change and natural disasters”* (Fresco and Kroonenberg, 1992).

In 1991, the International Union for Conservation of Nature (IUCN) mentioned sustainable development as a development that improves the quality of human life while living within the carrying capacity of supporting ecosystems (IUCN, 1991). Bell and Morse (1999) indicated that ”sustainable” is an adjective becoming both a descriptor of something and a target to achieve, and our discussions of sustainability could be employed to anything that has ”sustainable” as an adjective. Bell and Morse (1999) also concluded on a subjective term to all sorts of value judgments of sustainability, where sustainability is

represented by a change in a property referred to as ”system quality” (Fig. 8). Sustainable equates to a situation where quality remains the same or increases (lines 1 and 2 in Fig. 5). If quality declines, the system can be regarded as unsustainable (line 3 in Fig. 8).

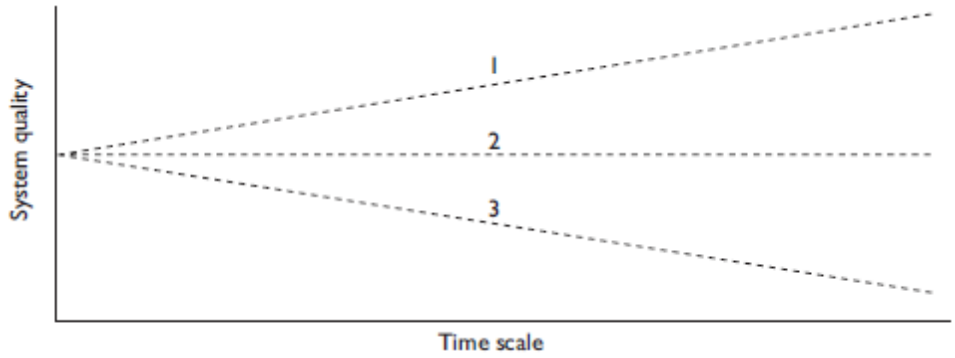

Figure 8. System quality and sustainability
1 = Sustainable (increase in quality)
2 = Sustainable (quality remains constant)
3 = Unsustainable (quality declines)
(Bell and Morse, 1999)

However, this thesis does not open a debate about the meaning of ”sustainable” and ”sustainability”, and this thesis does not seek to elaborate on different definitions. In my opinion, sustainability began with emphasizing the role of human society to actively manage the process of becoming sustainable or to maintain the quality, or the resources remains the same or increases. Sustainability, *like development, is all about the people* (Bell and Morse, 1999). It is an intervention of human activities in order to make sure that the resources are still sustainable or that the goal of sustainability has been reached (Bell and Morse, 1999). According to Fresco and Kroonenberg, (1992), sustainability must be made operational in a specific context (e.g. forestry, agriculture), at scales relevant for its achievement, and appropriate methods must be designed for its long-term measurement. Yet in the end, sustainability is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs (Wirsenius et al., 2009). Food And Agricultural Organization of the United Nation (FAO) extended the definition of sustainability as an effective integration of the environmental, economic and social dimensions of development which can only be achieved through good governance (FAO, 2013). FAO defined ”*sustainable development in*

agriculture sector conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable". The process is not easy or straightforward.

Sustainability requires practices to make it possible to maintain resources as well as to minimize the use of input and to be more equitable in its impact of the practices (Morse, 2010). Moreover, sustainability also concerns how to maintain the stock of resources, how to improve the distribution of income, and how to reduce the degree of vulnerability. According to (WCED, 1987), the pursuit of sustainability requires: "*A political system that secures effective citizen participation in decision making, an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis, a social system that provides for solutions for the tensions arising from disharmonious development, and a production system that respects the obligation to preserve the ecological base for development, a technological system that can search continuously for new solutions, an international system that fosters sustainability patterns of trade and finance, and lastly an administrative system that is flexible and has the capacity for self-correction*". Moreover, WCED (1987) emphasized the demand of an integrative concept of sustainability goals, including a decent standard of living, social cohesion, full participation, and a healthy environment (WCED, 1987). Thus, sustainable development as elaborated in Agenda 21 (UN, 1993; Spangenberg, 2004; FAO, 2013) has four dimensions: the social, the economic, the environmental, and the institutional or governance (Fig.9). Figure 9 shows the need to integrate four dimensions into a harmonized structure concept of sustainable development. The environmental dimension comprises all geo-biochemical processes under human practices to maintain the natural capital stock. The social dimension represents the individual human assets such as skills, dedication, experience, and social attitudes. The governance dimension refers to interpersonal systems of rules governing decision making, i.e. not only organizations, but also institutional mechanisms and orientations. The economic dimension refers to maintenance of the system of economic production by generation of sufficient (economic, monetary) benefits (Spangenberg, 2002).

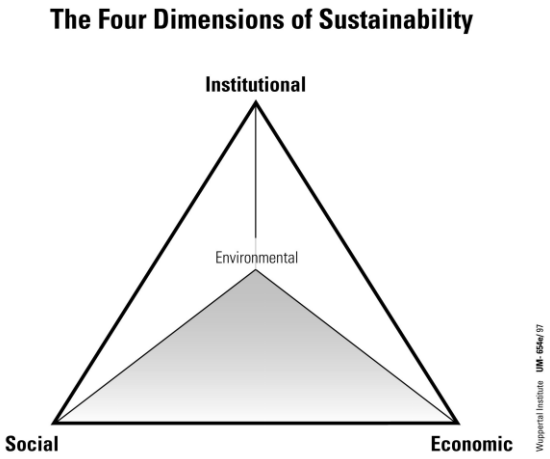

Figure 9. Four dimensions of sustainability
(Spangenberg, 2004)

3.2.2. Sustainability Assessment

Opportunities for improving sustainable practices can emerge from measuring where we are now, and how far we need to go. In line with this, numerous assessment methods (many for agricultural systems) have been launched in the last decades. Sustainability assessment has been defined as "*a tool that can help decision-makers decide what actions they should take and should not take in an attempt to make society more sustainable*" (Gasso et al., 2014), or a tool to ensure that "*plans and activities make an optimal contribution to sustainable developmen*t". Existing sustainability frameworks have been developed by a diversity of institutions such as universities, corporations, civil society, and national and international organizations and range from environmental and social standards to corporate codes of good practice and social responsibility involving different goals and scopes. Despite intensive research efforts, there is still a lack of agreement on how to best assess progress toward sustainability (Gasparatos and Scolobig, 2012).

Examples of sustainability assessment frameworks include the Sustainability Assessment of Food and Agriculture Systems (SAFA), the Response-Inducing Sustainability Evaluation (RISE), and the Committee on Sustainability Assessment tool (COSA) (Gasso, 2014). Recently developed and already tested in a diversity of contexts, these frameworks can be considered the state of the art in terms of context-generic indicator-based methods for assessing sustainability of agricultural systems (Gasso et al., 2014). The three frameworks have a global geographic applicability but differ in terms of sector applicability. Specifically, SAFA covers a wider range of industries (cropping, livestock husbandry, forestry, fisheries, and aquaculture), while RISE mainly focuses on

cropping and livestock husbandry and COSA on cropping industries. SAFA is performed at the supply chain or at a single supply chain component (e.g. farm) level, while RISE and COSA are performed only at farm level. SAFA covers a wider range of sustainability dimensions and aspects, especially in relation to the governance dimension. SAFA and COSA have both societal and organizational sustainability perspectives and target a diversity of stakeholders (e.g. supply chain stakeholders, policy makers, and non-governmental organizations), while RISE have mainly an organizational perspective and mostly targets agricultural producers (Gasso, 2014).

Different practitioners use different terminologies to characterize indicator-based sustainability assessment components and processes. The FAO is currently trying to homogenize the sustainability assessment terminology in the global agricultural context with its Sustainability Assessment of Food and Agriculture Systems (SAFA) guidelines (FAO, 2013). These guidelines provide the basis for defining the sustainability assessment in this thesis.

Indicator-based sustainability assessment methods are generally structured according to several hierarchical or aggregation levels. The most general level comprises sustainability dimensions (Commission on Sustainable Development, 2001). Figure 10 shows examples of sustainability framework from the SAFA framework developed by FAO. These are general discipline-independent fields which are normally differentiated into environmental, social, economic, and governance. At the intermediate level, each dimension comprises a number of themes and subthemes. These are defined as the relatively independent elements associated implicitly or explicitly with specific sustainability goals and objectives (FAO, 2013). When themes are divided into sub-themes, higher order sustainability goals are connected to the themes and specific objectives to the sub-themes. Themes and sub-themes are also referred to as principles and criteria, impact categories and subcategories, or components (Bélanger et al., 2012). Each theme or sub-theme is linked to one or a number of indicators. Indicators are the most specific level. Indicators are measureable criteria for sustainable performance for the sub-theme (Lee, 2006; FAO, 2013). As an example of the different aggregation levels in the SAFA framework, the ”environmental” dimension may have an ”atmosphere” theme which includes a ”greenhouse gases” sub-theme which in turn uses the ”organisation’s annual net CO2-equivalent emissions per tons of produce” as an indicator.

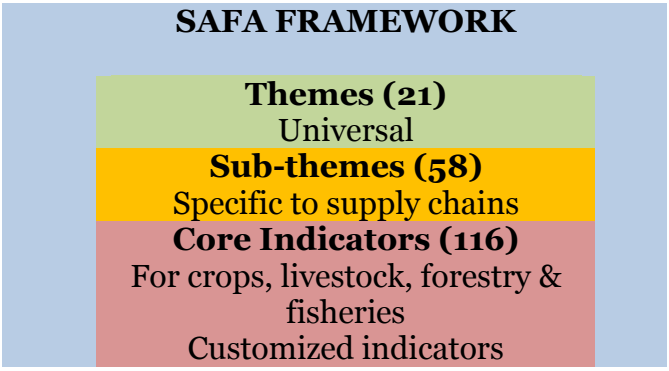

Figure 10. SAFA Framework. The SAFA framework comprises four dimensions (i.e. governance, environmental integrity, economic resilience and social well-being) and twenty-one sustainability themes, which are defined by fifty-eight subthemes with 116 indicators.
(FAO, 2013)

3.3. The discussion of Sustainable Development in Indonesia

World population growth has grown faster than the growth of livestock and crop production (FAO, 2011a; Graeun et al., 2015). However, there are more people in the world that do not get enough food; global agriculture has the potential to grow enough food for all, but food is often not available where it is needed (Wirsenius et al., 2009). Sustainable development is challenged, and it is a long process to become sustainable. These problems cannot be treated separately by fragmented institutions and policies. They are linked in a complex system of cause and effect. The concept of sustainable development provides a framework for the integration of all aspect in policies and development strategies – in related with the integration of environment, social, economic and governance. Hacking and Guthrie (2007) added that the pursuit of sustainable development requires changes and support in all levels of decision making globally.

The discussion on sustainable agriculture in Indonesia has become important, especially when the government proposed government programs related to sustainable development in the Indonesian Agenda 21 (Ministry of Environment of Republic Indonesia, 1997). In order to face future challenges, agricultural and rural development strategies should be changed and environmental, social, economic, and governance considerations must be integrated into agricultural practices with the final objective being the sustainable provision of food that is safe for public health. As the agricultural world

enters an era in which global food production is likely to double due to increasing population, it is critical that agricultural practices are modified to minimize environmental and social impacts, even though many such practices are likely to increase the costs of production (FAO, 2011b). Indonesian Agenda 21 proposed a variety of concrete activities to shift toward sustainable agricultural practices (Ministry of Environment of Republic Indonesia, 1997). Overall, it recommends the inclusion of both long-term planning and four sustainability dimensions as criteria in all major policy and program activities such as ”Improvement in Agricultural Products and Farming Systems through Diversification of Farming”, ”Development of Supporting Infrastructure”, ”Integrated Pest Control” etc. The Indonesian Agenda 21 was being disseminated and discussed at various levels of the government and the community at large. Plans were underway to integrate the Agenda 21 Indonesia into the Five Year Development Plan (Repelita VII) and to develop the Local Agenda 21. In order to carry out the full integration of the basic principles and concerns of the Indonesia Agenda 21 into development plans, two major phased activities have been conducted. These are: 1) communication and consultation process and 2) integration of the agenda into sectoral and regional planning, including the enhancement of community participation in sustainable development (Ministry of Environment of Republic Indonesia, 1997).

Having looked at the sustainable development and beef self-sufficiency program in Indonesia, I concluded that it is important to explore the situation of smallholder beef cattle farming in Indonesia and on basis of this to discuss aspects of sustainability in the context of the Indonesian smallholder farming system in order to support the government policy for self-sufficiency.

4. Methodology

4.1. The study area

Figure 11. Map of the Central Java Province, Indonesia. The Semarang Regency was chosen among 29 *kabupaten* (regencies) and 6 *kota* (*cities*) in the Central Java Province (Indonesian Statistical Bureau, 2013)

The study was conducted in the Semarang Regency, the Central Java Province, Indonesia. Administratively, the Central Java Province is divided into 29 *kabupaten* (regencies) and 6 *kota* (*cities*) (Fig. 11). With a total area of 3.25 million hectares, it occupies 25.04% of the Java Island (1.70% of Indonesia). Setianto (2014) stated that out of its total land area, 30.44% (991,000 hectares) is wet-land (*sawah*) which is mostly allocated to rice production. Based on the National Socio Economic Survey in 2008, the total population in the Central Java Province was recorded to be 32.63 million persons, almost 14% of the national population (Indonesian Statistical Bureau, 2013). This makes Central Java the third most populous province in Indonesia after West Java and East Java. The province was selected because it has the second largest cattle population in Indonesia (Directorate General for Livestock and Veterinary Services, 2015). The Semarang Regency is located on the north side of Semarang City, the capital city of the Central Java Province.

The Semarang Regency plays an important role in meat production because it has the largest population of beef cattle in the Central Java Province. There are 19 districts in Semarang Regency (Fig. 12). The Semarang Regency was chosen because of the on-going rural development program in the locality. Besides, the Semarang Regency is representative of an upland-growing area with existing cattle raising activities and has a natural resource potential for fodder production. Moreover, it is characterized by a favorable cooperation and capability of the local government unit, the presence of a farmer' association and secure land tenure.

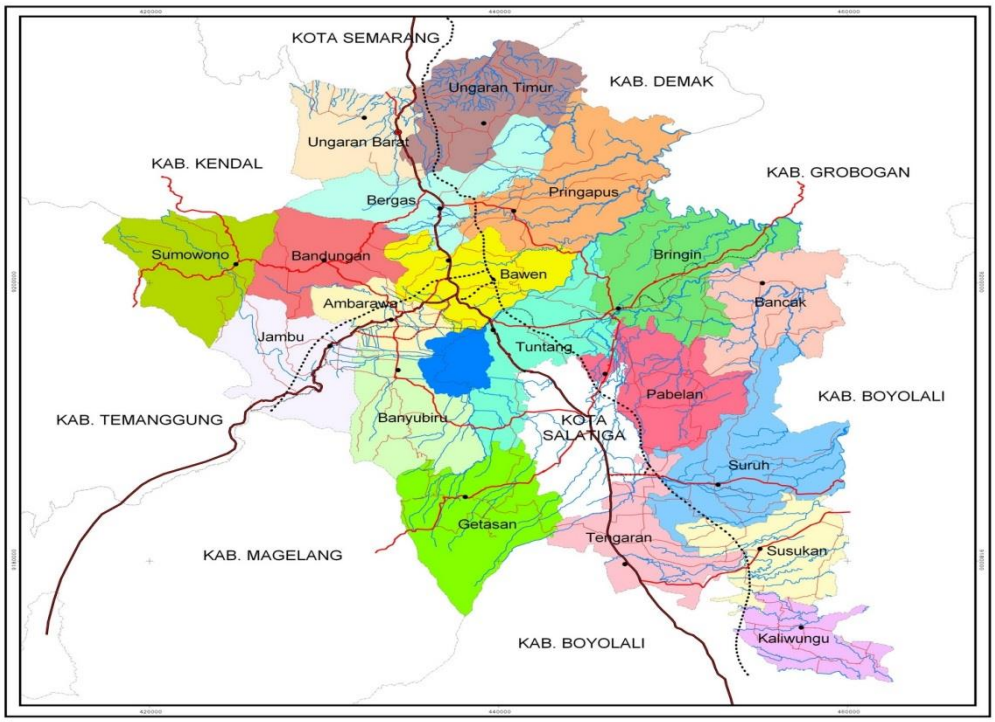

Figure 12. Map of the Semarang regency. The Semarang Regency consists of 19 districts. (Semarang Regency Statistical Bureau, 2013)

4.2. Scientific methods

4.2.1. Choices of field study methods

One way of thinking about fieldwork is to think about its diverse settings in order to answer research questions. Yin (2011) stated that choosing the field of study must be carefully planned by determining how effectively participant criteria are defined and how well recruitment is carried out in the field. Table 1 shows the study materials and methods field settings in my PhD thesis. The participants shared some common conditions by either

being a beef cattle farmer, who is assisted by family laborers, interacting as a group, residing in certain geographical areas, or serving as members of similar institutional settings (as extension agent; Paper 2). With this common condition, I believed that my qualitative research interviews attempted to understand the experience from the interviewees' point of view, to unfold the meaning of people's experiences, and to uncover the lives they lead prior to scientific explanations (Yin, 2011). Moreover, related to the number of participants in the interview, the sample size was determined based on the concept of saturation in qualitative interview research (Mason, 2010), where no additional information seemed to add to the study after 14 interviews in paper 1. Hence, I concluded that the concept of saturation was reached (Paper 1). In paper 2, I included all 14 extension agents in the Semarang regency in order to understand how they perceived their own role and working conditions. My reasons for selecting participants in Papers 3 and 4 will be explained in detail in Sections 5.3 and 5.4.

Table 1. Study materials and methods

	Paper 1	Paper 2	Paper 3	Paper 4
Number of Participants included	14 farmers	14 extension agents	6 farmers	16 participants
Method of the interviews	semi-structured qualitative research interviews	semi-structured qualitative research interviews	SAFA guideline research interviews	2 Focus Group Discussions

4.2.2. Access to the field

In qualitative research, it can be important to have a key informant or gatekeeper in the research area, in order to gain access to the group. The gatekeeper is the key people who let the researcher in, give us permission, or grant access to the field (O'Reilly, 2009). One of the most important roles of gatekeeper is to introduce the researcher to the people in the environment in general and because of the connection to the gate keeper, people feel more confident with the researcher. The head of Livestock and Animal Health Office Central Java Province was approached as 1st key informant in this thesis (Fig. 13). He introduced me to another key informant-the head of the Semarang Regency Livestock and Fishery Office, and thus I got access to the field and was given permission to do research in

his area (Fig. 13). O'Reilly (2009) mentioned that the key informants often help researchers to collect their qualitative data as well as to raise exactly the range of issues or the essence of the research topic. During the data collection the role of the key informants was really important, e.g. to explain about events related to the implementation of the BSSP or government concept of sustainability. More details of the research area, key informants, and participants of the research are presented below in Fig. 13. Maintain collaboration with key informants was needed. Key informants from province level and regency level were very helpful to open the access to the 14 extension agents in Semarang Regency, and thus enabled me to interviewed farmers participants (Fig.13).

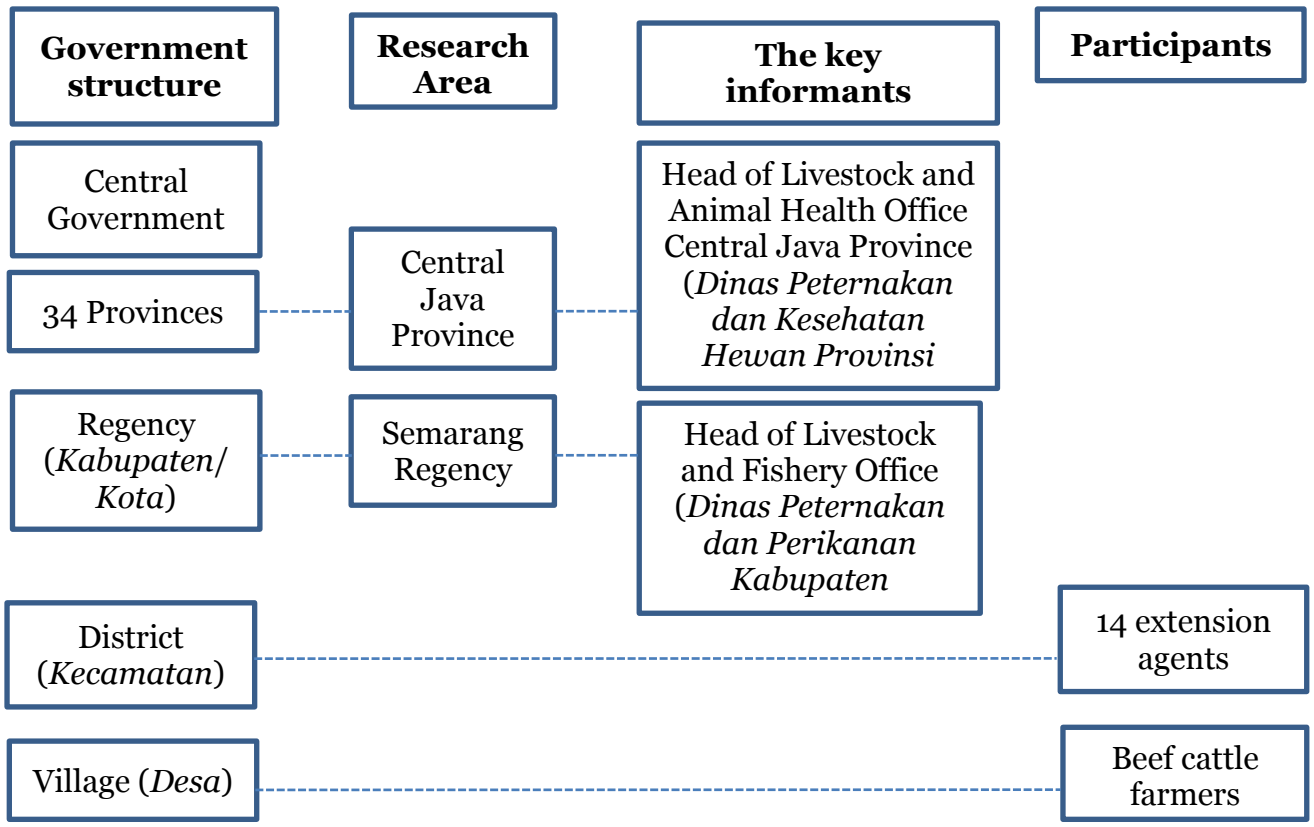

Figure 13. Research Area, key informants, and participants of the research.

4.2.3. Data collection

4.2.3.1. The semi-structured qualitative research interviews (Papers 1 and 2)

The research approach in this study was semi-structured qualitative research interviews. The qualitative research interview method aims to explore and describe how a phenomenon is experienced and perceived by a range of actors in the field, to understand this phenomenon in order to answer research question. The method does not quantify or build on a representative sample of opinions. The interviews are conducted using an interview guide consisting of thematic questions, which lead to a conversation aimed at understanding and jointly interpreting the meaning of what the interviewee says and explains (Kvale, 1996).

Why do qualitative research? Qualitative research allows the researcher to get the inner experience of the participants, to determine how opinions are formed through and in culture, and to discover rather than test variables. Doing qualitative research was a challenge that brought the whole self into the process and presented an opportunity for researcher and participant to connect. Qualitative research involves the collection, analysis, and interpretation of data that are not easily reduced to numbers. These data relate to the social world and the concepts and behaviors of people within it, which may not have been possible to reach in quantitative research. I have followed the suggestions of Corbin and Strauss (2008) who said that…"*I am not afraid to draw on my experience when analyzing materials and be more objective and not using personal experience to explore my participants' perception over research topic*". I watched very carefully and listened intensely to what people said and how they expressed their ideas through data interviews. I was looking back to my data and carefully questioning me when more information was needed and not jumping to conclusions over research topic by seeing the world from the participants' perspective even though I have realized during my qualitative research that the volume of data makes analysis and interpretation time consuming. I have tried to avoid personal bias, because another limitation of the qualitative research is that the research quality is heavily dependent on the individual skills of the researcher and more easily influenced by the researcher's personal biases (Anderson, 2010).

Creswell (2009) argued that qualitative research is able to translate human experience into words with openness and more depth. Qualitative research takes a subjective view and is related to the respondent's view in order to explain what is going on

around a phenomenon (Patton 2002). Qualitative research applies inductive theory where a theory is developed based on observation. It has provided a richer and deeper understanding of the event although it does not make the generalization (Patton 2002).

I have chosen semi-structured interviews for data collection in my qualitative research. In my opinion, the process of semi-structured interviews was enjoyable. I discovered several benefits of doing semi-structured interviews compared with other types of interviews in qualitative research, such as structured qualitative interviews. Semi-structured interviews are often preceded by open-ended questions, observations, informal and unstructured interviewing in order to allow the researchers to develop an understanding of the topic of interest for developing relevant and meaningful results (Leech, 2002). Semi-structured interviews also allow participants to express their views in their own terms (Baribal & White, 1994).

Before conducting the interview, I developed an interview guide that helped me to direct the conversation toward the topics and issues I wanted to know about. For my consideration, the content and the context of the interview are both important aspects of the process, such as making a list of the necessary open-ended topics/data and arrange them thematically. For me, the interview guide was a guide, not a ”prescription”, which allows for focused, conversational, two-way communication. I had worked out a set of questions beforehand, and during the interview process, I could change the order of the questions and give explanations or leave out questions that would appear redundant. The interview guide also stimulated interviewees to provide responses in their own words and terms and in the way that they think and use their own language.

4.2.3.2. SAFA ASSESSMENT (Paper 3)

The SAFA framework was developed by FAO to support the implementation of effective sustainability management and communication in the food and agriculture sector. The aim behind the development of SAFA was the need for globally applicable sustainability assessment approaches that consider the complexity and relationships within the components of sustainable development (including the governance dimension) as well as the need for a common understanding and language for sustainability assessment (FAO, 2013). The goal of SAFA assessments is to holistically assess an enterprise performance along the four dimensions of sustainability (governance, environmental integrity, economic resilience and social well-being) using harmonized

approaches that contribute to making sustainable food chains more transparent, measurable and verifiable. It is a framework that encompasses four sustainability dimensions and gives the possibility to assess barriers and synergies among all dimensions of sustainability. The target audience of a SAFA assessment is small, medium and large-scale companies, organizations and other stakeholders that participate in crop, livestock, forestry, aquaculture and fishery value chains. However, as a framework and harmonized global assessment approach, SAFA is also relevant to governments' strategies, policy and planning.

The SAFA guideline version 3.0 (final version) (FAO, 2013) is the result of five years of participatory development. Since its early phases, the SAFA guidelines have been designed based on the experience of existing methods and analyzing the conceptual framework and indicators sets with different stakeholders. In one of its latest phases, FAO called for voluntary pilot tests of the SAFA guideline version 1.1 (test version) from September 2012 to March 2013 through spontaneous contributions and comprised 30 different settings. These included cropping, livestock, fishery, aquaculture and forestry in 19 developed and developing countries within the five continents in order to ensure the smooth applicability, usefulness, acceptance and scientific soundness of the guideline version 1.1. Outcomes from the pilot studies were reported and discussed in the SAFA Practitioners and Partners Workshop in Rome in March 2013 which guided the development of the SAFA guideline version 2.0 which was released in July 2013. It led to the finalized SAFA guideline version 3.0 (used in this study) and the SAFA IT tool (Gasso, 2014).

4.2.3.3. Focus Group Discussions (Paper 4)

Focus group discussion (FGD) is well established as a legitimate data collection method within the qualitative research tradition. The rationale behind the use of FGD in this thesis was that focus group participants provided diverse experience, which encourages a greater variety of communication, and therefore different contents, than other qualitative methods of data collection (Halkier, 2010). The advantage of FGD includes how group interactions can reveal and highlight the participants' perceptions, attitudes, thinking, and framework of understanding, as well as identify group norms, sub-cultural and cultural values. The method of FGD was chosen because it allowed the participants to express their opinions and discuss with each other in the group. As a

research tool, it provided insight into how the participants were thinking about their range of opinions, experiences, practices and ideas, including inconsistencies and variations between participants (Halkier, 2009).

In focus group discussions, a small group of participants gather to discuss a particular issue under the guidance of a moderator. The discussion usually lasts between 60 and 90 minutes and is normally audio or video taped, and then transcribed and analysed (Barbour, 2007; Wibeck et al., 2007). Focus groups have the ability to allow researchers to study how people engage in a group including how views are constructed, expressed, defended and modified in the context of discussion and debate with others. FGD enable researchers to study and understand a particular topic from the perspective of the group participants themselves, especially sensitive topics such as for example HIV/AIDS (Wibeck et al., 2007). Observations may be more appropriate for studies to understand a particular setting or society by taking part in the everyday routines of the participant, but FGD are particularly suited for the study of attitudes and experiences as collective views. Individual interviews may be more appropriate for tapping into individual biographies, life worlds and experiences, but FGD are more suitable for examining how knowledge, and more importantly, ideas, develop and operate within a given cultural context. Questionnaires are more appropriate for obtaining quantitative information and explaining how many people hold a certain opinion, but focus groups are better for exploring exactly how those opinions are constructed and explaining why these occur (Kitzinger, 1989).

4.2.4. Reflection on methodologies

Kvale and Brinkmann (2008) stated that key questions during the qualitative research interviews are ”*what is going on here?*” and ”*what do I want for my research?*”, and ”*what do I do to answer my research question”*. It guided me during the whole research process, including the development of the interview guide.

An interview guide was important in guiding me during the process, and it referred to my research questions. While an interview process may seem a simple arrangement of questions and answers, this does not hold true in practice. Thus, the question becomes one of the interactions and the social construction, achieved between the researcher and the participants (Kvale, 2006). In addition, it is important to be prepared and know exactly what the aim of the interview is and have list of questions that suitable or appropriate for

the interviewees. It was important for me not to lose sight of what was happening during the interview. I was quite surprised by the depth of information offered to me by my participants. I was just amazed at how willing people were to talk to me about the personal details of their lives related to their farming activities. I felt that the act of listening to the participants' stories often validated the experiences of the participants by giving them the time to talk about themselves. It was about respectfully listening to someone's story without comment, and it is about listening to them and affirming the answer by listening. I have gained experience working with qualitative research in my PhD thesis. One of the challenges was choosing methodology which was relevant with my research question. I have realized that data which were to be analyzed from the start and it influenced at later stages of research process, e.g. when I found missing data in the previous interview, thus I need to go deeper in the next interview. Hence, the interview was kind of reflection into methodology and research progresses, how my methods can provide answers to the research questions.

5. Results

5.1. Paper 1

The implementation of Indonesia's beef self-sufficiency programme (BSSP) as seen from a farmer family perspective

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The Implementation of Indonesia's Beef Self-Sufficiency Programme (BSSP) as Seen from a Farmer-Family Perspective

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Abstract

Since around 1990, Indonesia had been importing about 40% of its entire beef consumption. To reduce its reliance on imports, Indonesia launched the beef self-sufficiency programme (BSSP), which operated between 2005 and 2014, with the aim being to reduce imports of beef cattle to 10% of national demand by 2014. This was particularly challenging at the time because the demand for beef had continuously increased for a number of years. The aim of this case study was to investigate how Indonesian smallholder farmers perceived their own beef-cattle production in line with the BSSP, with a particular focus on the way in which the programme was implemented. The present study is based on the findings from 14 semi-structured qualitative interviews carried out with smallholder beef-cattle farmers from the Central Java Province in Indonesia. A modified grounded theory approach was used to analyze the data, using the software program Transana. The study showed that the farmers were mostly unaware of the existing government policies on beef-cattle farming, i.e., regarding the BSSP, including the overall aim of these policies. Furthermore, the activities they did know about they viewed as individual activities run in isolation, rather than parts of a grander plan or overall larger targeted programme—note, in this paper, we refer to these individual activities as 'fragments'. The farmers who took part in the interviews outlined the challenges they faced in increasing the quantity and quality of their beef cattle. The participating farmers also outlined their experiences of how elements of the BSSP were presented to them and how these initiatives were taken up (by themselves, colleagues, or in the local community). The results of the present study show that the farmers were mostly not aware of the overarching policies like BSSP, and hence there is a clear need for the government, i.e., via the Livestock and Fishery Office, to improve how it disseminates knowledge and information about its policy programmes, particularly to the players most affected by those policies. We identified a clear need for the relevant government institutions to take the initiative and work more closely with the main players, in this case the beef-cattle farmers. Involving the farmers is considered crucial in order to create and maintain sustainable beef production. Considering the farmers' perspectives of how extension agents approach the practical implementation of governmental agricultural policy programme, such as the BSSP, we furthermore suggest that more transparent communication is needed, together with the closer involvement of farmers in all

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stages of the programme, i.e., not just in implementation, but also in the design and planning stages, as well as in the post-programme evaluation, in order to learn effective lessons to improve future programme delivery.

Keywords: Indonesia; smallholder farmers; beef cattle; farmer perceptions

1.0 Introduction

The Indonesian agricultural sector comprises 14% of the country's aggregate Gross Domestic Product (GDP) (Indonesia Statistical Bureau, 2013, p. 560). Livestock is a very important part of this sector, and to Indonesia's economy overall, and plays a vital role in many different aspects of national and daily life, including in providing national food security, as nutrition, in generating income and savings, and in many social and cultural functions. Beef cattle play a significant role in the livelihood of many people living in smallholder farms in rural areas, particularly regarding their family income, nutrition and welfare (Priyanti, Hanifah, Mahendri, Cahyadi, & Cramb, 2012). Indeed, most rural people rely on farming, in one form or another, as their main occupation.

However, despite this large agricultural sector, Indonesia has not been able to meet its national beef demand for many years. It was estimated that up to 1990, Indonesia was importing about 40% of its entire beef demand (Hadi, Ilham, Thahar, Winarso, Vincent & Quirke, 2002). Since then, imports, in particular from Australia, increased year to year (Tseuoa, Syaukat, & Hakim, 2012). This eventually led to the Indonesian government launching the first beef self-sufficiency programme (BSSP) in 2005. Beef cattle in Indonesia are used for draught power, for generating capital (hence income and savings), and as a part of the nutrient recirculation on the farm. Beef cattle essentially convert agricultural waste and its by-products into meat and also provide the farmer with manure. The demand for meat in Indonesia is growing as a result of urbanization, the growing population, and the rapid growth of the urban middle class economy and its tendency to spend money on food (Permani, 2011; Priyanti et al., 2012; Vanzetti, Setyoko, Trewin & Permani, 2011). Indonesia's rate of beef consumption is estimated to be 2.6 kg/person/year on average (Indonesia Statistical Bureau, 2013, p. 485). Given that the population of Indonesia is about 248 million people, this means that about 645 thousand tonnes of beef meat should be produced each year to meet the consumption demand.

The Indonesian Beef Self-Sufficiency Programme (BSSP) was one of the Indonesian Ministry of Agriculture's key programmes in 2004-2013. The aim of the BSSP was to reduce the imports of beef cattle to 10% of the total demand by 2014, and to achieve long-term self-sufficiency based on local cattle meeting the increasing population's demand for beef. The BSSP was implemented during 2005-2013 in Indonesia in order to build local and national capacity for self-reliance regarding beef production. The guidelines for implementing the BSSP in Indonesia were designed by the Ministry of Agriculture, and described an action plan to accomplish the programme in collaboration with and via networking between different government organizations under the ministries of Agriculture; Trade, and Finance, respectively. According to The Regulation of Indonesian Department of Agriculture No 19, 2010 concerning the implementation of the beef self-sufficiency programme, the BSSP sought to increase the number and productivity of the domestic cattle herd.

It was intended to influence and promote the continuation of the cattle production system in Indonesia, and thus had significant implications for small-scale producers.

Long (2009) stated that a development programme can be analyzed systematically from conception to implementation through applying a systematic methodological approach. This includes the responses and lived experiences of the affected social actors (Long, 2009, p. 34). He emphasized a focus on the novelty of the strategies and processes of change, as well as the link between several relevant actors and their different actions. An understanding of farmers' perceptions of the implementation of any agricultural development programme is crucial for understanding how best to implement a policy and what challenges the process of implementation may face. Qualitative studies can contribute to this understanding through exploring the worlds of the farmers, i.e., their working and life situations, and how they see the implementation process and the potentials and challenges of implementing the policy in the context of its impact on the farmer families. This may not have been considered in the past, but nowadays, studies on farmers' perception have started to attract significant research interest in the world (Long, 2009, p. 44).

For instance, in a study about farmers' perceptions of and adaptation to climate change in Africa, Maddison (2007) suggested that it was important to know about and understand the farmers' perceptions of climate change in order to be able to improve policies on climate change. Generally, the awareness and perceptions of a problem shape the action of the relevant players and can reflects how a policy is being implemented in practice. Gandini, Martı´n-Collado, Colinet, Duclos, Hiemstra, Soini, & Dı´az. (2012) studied farmers' perceptions of cattle conservation policies in eight European countries. He revealed that the farmers' lack of several things, such as improved breeds, access to clean water, capital and knowledge on modern adaptation strategies, acted as constraining factors for a number of conservation programmes. Furthermore, Long (2009) stated that studying peasants' perceptions of their current situation is very important for improving their active involvement in implementing programmes (Long, 2009, p. 26). Hence, taking the lead from these earlier studies, the outcomes of the present study may be useful for policy-makers to identify key elements in designing policies and programmes.

The aim of this study presented then was to explore the experiences and perceptions of the BSSP by beef producing farmer families in the Semarang Regency, Central Java Province, Indonesia, and to ascertain how they had perceived the implementation process, as well as to what they saw as the main challenges and development options in the future.

2.0 Material and Methods

The research approach in this study involved the use of semi-structured qualitative research interviews. The qualitative research interview method aimed to explore and describe how a phenomenon is experienced and perceived by a range of actors in the field, in order to gain a greater understanding of a certain phenomenon in its application context. The method does not quantify or build on a representative sample of opinions. The interviews were conducted using an interview guide consisting of thematic questions, which helped the interviewer have a structured conversation/interview to aid the understanding of the responses from and between different interviewees, by helping to interpret the meaning of what the interviewee says and expresses (Kvale, 1996, p. 11). The method of analysis used was a modified grounded theory approach, which is described in more detail below.

2.1 Data Collection

Data was collected in the period February–April 2013 in Semarang Regency, Central Java Province, Indonesia. This area was chosen as a case study area because it has the second largest beef-cattle population in Indonesia. The study was limited to this area only because of financial and time constraints.

The head of the Central Java Province Livestock and Fishery Office was approached as a key information source, because of its knowledge about the area and the villages. Two villages (named Village A and Village B) were selected to take part in the study, based on the distance of the selected villages from the Livestock and Fishery Office (LFO) premises. We hypothesized that the implementation of the policy would differ between close and distant locations from the LFO, which was the implementing partner with the most contact with the farmers. Village A was close to the LFO and Village B was far away from the LFO. Each village contained at least one farmer group related to cattle production, and the interviewees were selected from these farmer groups, which in these cases had 35 and 41 members, respectively. The two farmer groups in this research had been established since the early 1990s, specifically since 1991 and 1993, respectively. Usually, a monthly meeting took place. The farmer groups comprised farmers who were relatively homogenous regarding the size of their farms and numbers of cattle. This meant that some farmers in the village who might have had cattle but who were very different in terms of farm size were not included in the study. Seven farmers were selected from each farmer group, therefore, in total, there were fourteen farmers chosen to participate in the interviews.

The criteria for selecting the farmers were that the farmers had been members of their farmer group for more than two years, and they were chosen to cover a range of different backgrounds. Two of the interviewed farmers were members of the steering committee of their farmer group, and two of them had another job besides farming (a teacher and a driver). The farmers were selected in consultation with the head of the LFO. Out of the fourteen participants, twelve farmers were males, one farmer was female (a widow) and in one interview, both the husband and wife participated together. This was not possible in the other interviews, since most of the times the wives were doing housework or working in the field at the time of the interview. No other selection criteria were applied to ensure that a range of different types of people were covered. The sample size was mainly determined based on the concept of saturation in qualitative interview research (Mason, 2010), where saturation is considered as being reached when no additional information is deemed to add to the study after the fourteen interviews.

All participating farmers were individually interviewed (except for the case of the husband and wife joint interviewees), using an interview guide specifically developed for the field study. The interview guide was developed in English and translated into the Bahasa Indonesian language. All the interviews were recorded on tape, and the interviews lasted between 60 and 90 minutes. The interviewer asked the farmers about their working lives regarding the beef-cattle farming system they applied, including questions about their perceptions on the way in which the beef self-sufficiency programme was being implemented with the farmers. The farmer participants were encouraged to reveal all about their experiences throughout the interview. Table 1 shows characteristics of the participants.

Table 1. *Characteristics of the Participants*

Farmers	Age	Education	Occupation	No. of household members	Number of beef cattle (head)
Village A					
Farmer 1	37	Secondary school	Farmer	5	5
Farmer 2	39	High school	Farmer	4	3
Farmer 3	45	Elementary school	Farmer	6	3
Farmer 4	51	High school	Farmer	5	10
Farmer 5	31	High school	Farmer	4	4
Farmer 6	28	Bachelor	Teacher	3	3
Farmer 7	43	Elementary school	Farmer	4	3
Village B					
Farmer 8	55	Elementary school	Farmer	6	7
Farmer 9	32	Secondary school	Farmer	3	4
Farmer 10	35	Elementary school	Farmer	2	2
Farmer 11	41	High school	Driver	5	5
Farmer 12	31	Secondary school	Farmer	4	3
Farmer 13	39	Secondary school	Farmer	4	4
Farmer 14	43	Elementary school	Farmer	5	5

Note, all the farmer interviewees were male except for Farmer 11, who was female (a widow), and 'Farmer 2', which refers to a farmer couple, where both the husband and wife participated in the interview together

2.2 Data Analysis

All the interviews were transcribed and coded using the software program Transana. The interviews were analyzed using a modified approach to the grounded theory as described by Charmaz (2008, p.109). This modified grounded theory approach was used because the goal of this study was to explore a given phenomenon, based on an inductive and qualitative approach, and to develop a model of understanding, in this case why and/or how the selected Indonesian smallholder farmers experienced and perceived the current government policies on beef self-sufficiency in Indonesia, and its implementation among farmers. This approach does not attempt to make generalizations. The outcome of the modified grounded theory is presented as a narrative, including categories or themes in a so-called model of understanding, but not as an overarching theory.

The first step in the data analysis was coding or data reduction. The entire text was organized into small statements after the transcription of the interviews, and then coded with the aim being to organize the text into themes. The coding was followed by the identification of relevant keywords. Nine keywords were generated during the data analysis process and used for the categorization. The keywords were collected into themes, which produced a model of understanding connecting the comments from the different interviews. As a result of the initial analysis, the interviews were constructed around three theme areas (see the next section). The construction of the themes was supported by the quotes. The main quotes were selected and included in this paper to illustrate the range of different aspects of the farmers' experiences, perceptions and life situations, as they are the farmers' own words. However, the responses from all the farmers are included and represented in the analysis itself, not just those quoted herein.

3.0 Results

Based on the analysis of the interviews of the fourteen beef-cattle farmers, a model of understanding was developed, including the themes and keywords (see Figure 1).

The model illustrates and organizes aspects of how Indonesian smallholder farmers perceive their own beef-cattle production and the current government policy on beef self-sufficiency in Indonesia, including the way in which the policy is implemented, and how it relates to their daily life and work practices. Hence, the model of understanding can be described through three main themes: (1) the farmer's family life situation and daily practices, (2) implementation of the policy as seen from the farmer's point of view, and (3) the farmer's actions and reactions.

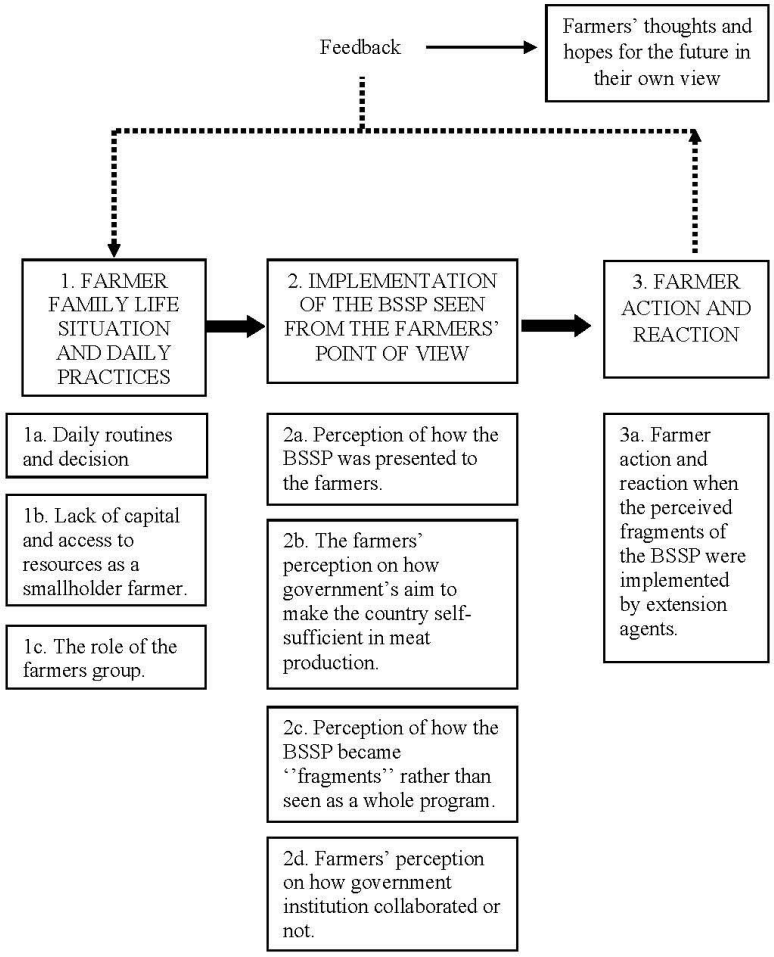
3.1 Farmer Family Life Situation and Daily Practices

3.1.1. Daily routines and decision-making. The first sub-theme is the farmers' families' life situation and decision-making. This sub-theme was created around aspects of what daily life was like for beef-cattle farmers in these villages, and how they made decisions. The interviewees with beef-cattle-farmers revealed that the daily work on the farms was usually led by the husband (as the head of the household), who was assisted by his wife and children, and in some cases by other family members living on the same farm, for example the parents of the husband, or grown-up children and their families. In one family, the household was led by a widow leading the work. Decisions related to the beef-cattle farming were usually made primarily by the household head, with other family members doing the work following instructions from the household head. This was illustrated by Farmer 4, who stated "Mostly I will make decisions regarding daily practices related to our cattle farming, while other family members are involved in feed processing and daily feeding of the cattle". In another household, there was a joint decision-making process, as e.g., illustrated in the quote from Farmer 2"… actually I am not working alone, my wife and the children often work together with me to help me in the farming practices. And my wife and I often make joint decisions about our farm; especially decisions involving money need to be discussed with my wife".

With regard to feed resources, these farmers generally used locally available cattle-feed resources from their own farm and from communal land, for example cut-and-carry feed stuffs, mainly because they were cheaper, and because the climate was favourable for growing these crops.

The farmers reported that they had general problems related to cattle diseases such as diarrhoea, gastritis, weight loss, loss of appetite, and indeed, in some cases, disease was considered one of the major problems in raising their cattle. Farmer 2 related this to lack of awareness regarding the possibilities for more careful cattle keeping "Most of the cattle are kept in individual stalls under shelter. However, some of the farmers have no permanent housing, they just leave the cattle under the tree, and then the cattle tend to get sick easily", and Farmer 3 added "According to the veterinarian, our cattle were infected by bacterial diseases. It might be that most of us are not aware of proper sanitation".

Figure 1. *Model of Understanding to Illustrate how the Interviewed Indonesian Smallholder Farmers Perceived the Viability of their own Beef-cattle Production, and the Implementation of the Beef Self Sufficiency Programme (BSSP) in Indonesia*



The farmers would sometimes ask for help from the local veterinarian, and some also discussed disease prevention with the local veterinarian, like for example by Farmer 6 who explained "Taking good care of animal health does not only mean treating an animal when it is sick, it also means helping the animal to avoid becoming ill. The best thing to do is to discuss disease prevention measures with a veterinary officer who will give advice that applies to a farmer's situation".

3.1.2. Lack of capital and access to resources as a smallholder farmer. According to the farmers, their farming system is traditional, as described by Farmer 9: 'Most of my co-farmers are still following traditional farming methods, old behaviours of cattle practices based on our experience'.

This traditional way of thinking also implied that they perceived their cattle as their savings, for instance as explained by Farmer 7 "The objective of my farming activities is to own productive assets as a form of savings and as a draught animal that can easily be converted into cash when needed".

Beef-cattle farmers are faced with many challenges in terms of resources. Farms usually remain small because of the limited access to capital and reliance of family labour on smallholder farms. This is a challenge because many small farms cannot support the farmer's families sufficiently with food and income. Most of the farmers share problems like low productivity of their beef cattle, scarce and low-quality forage, and a poor availability of feed concentrates – feed concentrates is a method of supplying supplements and additives feed to the cattle. Many farmers explained that they would favour artificial insemination for their cattle as they thought it would improve their stock productivity because of the better breeds involved in the insemination programme. However, the costs related to the inseminations were too high, and the farmers had to pay it themselves. The farmers all had experience of the staff from the Livestock and Fishery Office, coming twice per year and offering free artificial insemination on the spot; however, they stated that if the farmers' cows were not in heat, this impromptu visit was not appropriate. In addition, some farmers had experience of discovering a cow in heat, and the farmer being willing to pay for having the cow artificially inseminated and calling the inseminator, but then a lack of transport and the long distances involved, together with, at times, a lack of available semen, meant that the cow could not be successfully inseminated. The farmers also explained that they have difficulty in monitoring when their cows are in heat.

Generally, the lack of education in cattle farming was a great challenge. Farmer 7 explained:

> We don't have an educational background in farming systems, our farming practices are based on our experience, which leads to poor management of the farm, a lack of ability to monitor when our cows are on heat and problems with regard to feeding practices. We often need to find forage, especially during dry seasons, in the other villages. Even I can see that our cattle are under nutritional stress.

The interview analysis revealed that instead of improving their income from beef production, small-scale farmers are constantly in a comparatively weaker bargaining position. The standard price for live cattle is often determined by a blantik - a village trader or a middle men in the cattle marketing business, and the pricing mechanism applies to a 'guessing system', which means that the price is determined based on their physical condition, in combination with weight, as measured by a guess from the buyer rather than by using a measured weight. Most of the beef-cattle farmers have no experience in marketing, and find it difficult to enter cattle markets independently. There is no tradition in the two villages to collaborate in a group regarding joint marketing.

The quote from Farmer 13 revealed strong feelings towards the traditional marketing system "I hate blantik. We really want to enter the cattle marketplace, but the government has less concern towards farmer and limited human resources at the government level".

3.1.3. The role of farmer groups. This sub-theme covered issues related to the role of the farmer group in the farmer-family life and daily practices. Farmers had generally experienced that the farmer group in their village had assisted when them they needed it. The interviews revealed that group activities also stimulated them to become more socially active, for example, to attend group meetings, helping the building of communal stables, helping each other in cleaning and feeding the cows in communal stables. Farmer 1 stated:

> I will continue to benefit from being in the farmer groups in order to improve the performance of my beef-cattle farming, and for me, it is important to attend the group meetings regularly and to interact with other members of the group, I have better access to loans and it is easier to get new information and knowledge from the extension agent—a special agent whose job it is to educate farmers and producers about innovations in the field.

The interviewed farmers explained why it was so important to them to attend the group meeting, in terms of giving them the chance to get to know each other, exchange opinions, discuss a wide variety of issues and to learn from each other's experiences about farming activity. Farmer 1 emphasized that the benefits of joining the farmer group included better access to services than a farmer who is not a member of the farmer group.

Moreover, the farmers increased their trust in each other by joining a farmer group. Farmer 2 added "The steering committee of the farmer group can be trusted and they are willing to help whenever farmers need help". The farmer group steering committee always keep proper accounting records for transparency, such as records of the financial contributions from members and the distribution of donations from the Livestock and Fishery Office. He added that the steering committee members were welcome in members' farms for their views and for discussion whenever farmers had problems with their cows.

Farmer 2 said "If I need help, I am sure that my co-farmers would help me. We can totally trust the farmers in our village and most members of the farmer group are willing to help if I ask them". He mentioned that if he was in need of money for feed, he could borrow it from one of his fellow farmers. Finally, he emphasized that his participation in the farmer group also gave him access to donations from the government livestock offices, which actively participated in distributing these donations, which then helped him to collaborate with other farmers.

Farmer 2 also raised the point that the farmer group helped him to identify the problem areas in his farm and suggested solutions, just by joining up all the different existing experiences among the group members. Likewise, Farmer 7 said that being a member of a farmer group made him improve his management:

> The activities carried out in a farmer group provide me with knowledge and information to help improve my performance in beef-cattle farming, and for me, sharing and exchanging knowledge and information among farmers is important to improve our capacities in beef-cattle farming.

Generally, farmers reported that the general access to knowledge and information from livestock offices, extension agents and fellow farmers was easily disseminated through a farmer group, and that this was one great advantage of being a member of a farmer group.

3.2 Implementation of the BSSP Seen from Farmer' Point of View

3.2.1. Farmers' perceptions of how they were introduced to the beef self-sufficiency programme. The farmers were asked about their experiences on how the BSSP was presented to them. The farmers' stories were generally similar in that extension agents had visited the farmers at their farmer group and explained individual elements of the programme, such as for example issues about feed (see Table 2), without telling that this was part of a bigger programme.

The government provided services to the farmers during implementation of the BSSP, like e.g. artificial insemination as previously explained above, and as described in Table 2 below. According to Farmer 11, using established farmer groups as an entry point for dissemination of a policy was normally an effective way to communicate information to the farmers. In this case, farmers had, to a large extent, experienced that they were not informed about an overall policy aimed at the country developing self-sufficiency in beef cattle, but they were presented with different elements that potentially could increase production and minimize losses. The above-mentioned example of artificial insemination is one of these elements. Moreover, most of the participants observed that it had been impossible for the extension agents to reach all the farmer groups in an area, because the relatively small number of extension agents could not possibly manage to meet with all the farmers individually. Moreover, the farmers said that they had difficulties in understanding the messages that the extension agents introduced to them. Farmer 11 explained:

> In my opinion, the extension agents need to consider if their messages have been successfully delivered to the farmers. Perhaps, the agents sometimes forget that the farmers do not have a high educational level, and we need more time to absorb the information.

3.2.2. Farmers' perceptions of the government's aim to make the country self-sufficient in beef production. This sub-theme covers various aspects of how farmers had perceived the overall aim of the beef self-sufficiency programme and its context, especially in relation to their current life situation. The farmers knew about the large amount of imported beef cattle for example from Australia, and they were aware that it influenced the pricing of locally produced beef, but they believed that the government was not aware of how difficult it was to earn a living being a local beef-cattle farmer under this pricing system. The farmers did not really have information or knowledge about the actual content of the BSSP; for instance, how and why the programme was to be implemented. The interviews revealed that the farmers had not received sufficient information when the BSSP was presented to them, for instance about how the activities being implemented on the farms actually related to the BSSP, and how it was supposed to support them, and to support the country in becoming self-sufficient in beef production. Farmer 3 expressed:

> I think the government has concerns over the imports of live cattle and beef, but they don't really care about improving farmers' income. We don't know about the BSSP, the how and why about the programme. I only heard from the television, as well as the information provided by extension agents, but the detailed information about the BSSP has not yet been provided by government.

Farmer 6 described:

> There is fluctuation in the price of local meat at the moment because of the import of cattle, and it might be impossible for a smallholder farmer like me to improve my income. In fact, there is corruption scandal about the imported cattle from Australia, yet the government has continued to import cattle until now.

The farmers had obtained some information—partly from television news—that the government had launched a programme aimed at Indonesia becoming self-sufficient regarding beef production. However, the farmers experienced that the government did not address the fact that the price of their meat was too low because of the imports. This did not encourage them to produce more. The farmers who were aware of the existence of the BSSP generally did not see it as 'something for the farmers', but more as a policy addressing imports, but not giving solutions regarding improving farmers' lives, nor their incomes from beef production.

3.2.3. Farmers' perceptions on how the BSSP became fragmented rather than seen as a whole programme As explained above, the farmers were aware of the existence of the BSSP, but in practice it did not appear to the farmers as a 'whole programme'. Although it was true that certain activities were either initiated or enforced by government institutions in a stronger way than before the BSSP, with the aim of making it possible for the farmers to increase their production. These activities appeared to the farmers as separate elements that were not interconnected, and the farmers had not perceived them as being related to this overarching programme with an overall aim of making the country self-sufficient with beef. This is why we refer to them as 'fragments' in the analysis. Some of them, for example vaccination programmes and study tours, also existed before the BSSP, but according to the LFO officer, they now have more resources to enforce them in relation to the BSSP. Table 2 shows some examples of these 'fragments'.

During the interviews, farmers were asked about how they benefitted from the individual activities that had been provided by the government. Farmer 9 gave an example of this: 'We benefitted from the activities that had been implemented by the government in terms of "no cow mortality", and I think that all of the activities and resources provided by the government were part of the BSSP, but it was not presented as such'. It took a long time before he made any link between the individual activities and the BSSP.

Table 2. *Some of the services provided by the government during the implementation the BSSP, as perceived or experienced by the farmers*

- *Sapi gaduhan*: Assistance to farmers with breeder cattle through a revolving system designed to spread cattle to more farmers. Here, the government provides an individual farm household with one breeder cow. Within five years, the farmer must return the first two calves born to the government, while the farmer is permitted to keep the rest, including the breeder cow and the other calves. The two returned calves are distributed to other farmers.
- Farmers are invited on study visits to other farms, which had better conditions and therefore serve as a kind of demonstration farm.
- Feeding programmes to improve the quality and quantity of feeds. Concentrates and forages were developed to meet quality feed requirements, which were partly subsidized.
- Zero interest credit for holding a number of breeder cattle. The credit period is four years, with a grace payment period of one year. The credit instalments are 50% in year two and 50% in year four. Every farmer is a member of a farmer group. All the cattle are placed and maintained in a collective shelter.
- Vaccination and disease prevention programmes. The programmes largely concern the prevention, monitoring and control of animal diseases.
- Artificial Insemination Programme (AIP), including pregnancy tests. Farmers are provided the AI services to improve their cattle's birth rate.

Note: Some of these services also existed before the programme was initiated, but became more intensified during the BSSP. However, the farmers had not connected these activities with a larger policy programme.

3.2.4. Farmers' perceptions on how well government institutions collaborated. The farmers expressed their opinions on how well they thought government institutions worked and collaborated together during implementation of the BSSP. The farmers revealed that the extension agent in their village played an important role in providing assistance to the farmers when implementing the BSSP. Farmer 6 expressed: 'If I need help, the extension agents help me'. He explained that if he had problems with animal diseases or any activities related with the BSSP, he could call and get advice from the extension agents.

On the contrary, Farmer 11 said that the extension agent sometimes gave advice that was too costly. Farmer 5 expressed that "Extension agents, together with the Livestock and Fishery Office (LFO), provided activities and services; however, what they prepare for the farmer is not relevant under the farmers' situation, such as lack of funding, as well as coordination on a village and district level". In other words, farmers sometimes perceived that the extension agents gave them advice that was far removed from being practical in their daily lives, and for which they, for various reasons, could not use.

Far from the extension agents, traditionally farmers were more inclined to seek advice from the village leader and/or district leader. However, in practice the village leader and district leader only have administrative roles, and therefore, they played no role in implementing the BSSP. This was confirmed by Farmer 6, who revealed "There was no important role for the leaders at a village or district level in the implementation of the BSSP. However, the village leader has always supported farmer groups; they always come whenever there is a group meeting".

In addition, the farmers were also asked about how well the different government institutions had collaborated during the implementation of the BSSP. According to the farmers, Balai Pengkajian Teknologi Pertanian (BPTP)—the Assessment Institute for Agriculture Technology—gave assistance on feeding practices, but they had never informed the Livestock and Fishery Office as well as the village leader about their activity. Farmers 4 said "Our farming practices had been supported by BPTP giving assistance on feeding practices for three months already, although it was just a temporary programme and there seemed to be no collaboration with the Livestock and Fishery Office". Generally, the farmers thought that good collaboration was important among the different government institutions and the result of this could be highly beneficial for the farmers.

3.3 Farmer Action and Reaction

3.3.1. Farmers' actions and reactions to the individual activities related to the BSSP. The farmers were asked about their actions and reactions to the services that had been provided by the LFO. Farmer 12 said that he had taken advantage of the services that had been provided by the Livestock and Fishery Office, and mentioned some examples, such as advice about how to make a fermentation process of feed stuff, which had been introduced at a meeting organized by the LFO, as well as advice on how to access loans, he also had his cattle vaccinated twice each year. After the meeting about the fermenting of feed, Farmer 12 had tried to find additional information from the extension agent to make it work on his own farm. He added "I will use this method if it is easy to adopt and involves cheap raw materials. I also need to see that their suggestion is working, it has to demonstrate a clear relative advantage over the old practice".

However, Farmer 7 said that there were some farmers who did not want to change their practices to some of the new practices recommended by the government. Farmer 7 explained this in the following way:

> Some farmers did not follow the programmes, especially old farmers with lower education, because they did not believe it, as they only believe their own experiences. It was new to them, and they worried about the cost of it. That is the old behaviour of cattle practices that have been embedded in farmers for a long time, and they were not convinced about the use of new technology.

3.3.2. Farmers' thoughts and hopes for the future. Farmers talked about their hopes for the future for their farming systems. They were convinced that their own income could be higher if they could sell their cattle directly to the local cattle marketplace rather than to a blantik (village trader), and if an exact weighing system could replace the old guess-weighing system, as for example Farmer 9 said "As a smallholder farmer, it would be a good step to improving our income if we can go to cattle market instead of a blantik. I hope in the future we will not be using the guessing system anymore". However, the farmers knew that this could be very difficult, because the farmer groups had no resources e.g. for transport of the cattle, in contrast to the blantik. The position of the blantik was thus generally very strong in the villages.

The farmers also hoped that their own needs and ideas could be better involved and included when the extension agents implemented the government's policies and

goals. They wanted to be involved in the planning on how the programme could best be carried out in practice to work on their farms, as explained by Farmer 10:

> I wish that I could have the opportunity to inform the government staff about what I need before they come to us and introduce their programmes. It seems that we always forced to follow all of the activities from the Livestock and Fishery Office.

The farmers also suggested that the feed subsidies—as mentioned in Table 2—should continue, because they lowered the operational costs of the farm. Farmer 6 said:

> For most of our beef-cattle production operations, feed represents a significant portion of input costs. In my experience, feed costs constitute about 60 per cent of production costs, with the government subsidy on feed leading to a reduction in the operating costs last year. It would be a good idea if the government maintained the feed subsidy for our farming system.

Likewise, the farmers expressed the importance of continuing the vaccination programme to prevent disease. Farmer 3 said:

> I agree that prevention is the most economical approach to keeping disease losses low. I hope the government keep the vaccination programme. It will provide routine planned procedures that will prevent or minimize disease…it was very useful for me during the vaccination programme, twice per year staff from the Livestock and Fishery Office gave free vaccination to the cows.

4.0 Discussion

4.1 Government Activities and the Need for Farmer Empowerment

In the governmental regulation of the Indonesian Department of Agriculture No. 19 (2010, p.3), one of the objectives of the BSSP is to improve farmer's income and farming management. To enable this, the government needs to provide specific services. The interview results showed that the farmers perceived this very differently. The farmers explained that they the BSSP had not been presented to them as a whole programme, but rather it was presented to them mainly as a number of 'independent' smaller programmes, which herein in our analysis, we refer to as 'fragments' (see Table 2). Even though the government had already implemented some of these activities before the BSSP was introduced, the BSSP was supported by the central government with more funding and resources during the period where the BSSP was running. According to the governmental regulation of the Indonesian Department of Agriculture No. 19 (2010, p .9), the responsibility and decision power for distributing the funds related to the BSSP were given to the local LFOs. Some of these programmes, such as the use of artificial insemination, were imposed on the farms without involving or asking the farmer how they perceived the activity, or whether it fitted into the goal of the particular family farm. It seemed that the farmers were not presented with or involved in the overall goal of the policy, and thus they did not obtain an overview over the programme as a whole, and hence, it became difficult for them to share or take ownership over the goal of making their country, or even just their local area more self-sufficient in beef supply. Indeed, alternatively,

they may have been presented to the problem area of imported beef from Australia by television or other media, but the connection to their own farm practice and, for example, national beef productivity was not presented to them in a professional way by the relevant and responsible actors in the agricultural field. This meant that no room was given to the individual farmer to contribute to the planning and/or to the development of their own farm. When a farmer does not have the overview over a governmental policy, even though it involves their farm, it is impossible to be creative and innovative in the implementation process of the BSSP. A study by McCulloch (2008) about the fluctuation of rice prices and poverty in Indonesia suggested that providing better information on the policy and technical advice to the farmers helps them to improve productivity and contributes to achieving the overall policy goal.

Also, some of the activities, such as the vaccination programmes and farmer study-tour programmes, had existed before the initiation of the BSSP, which could have potentially added to the lack of acknowledgement and understanding of the BSSP as an overall programme and a government policy among farmers. Seen from the farmers' point of view, the LFO was doing the same activities that they had been doing during the previous decades. The fact that the extension agents had intensified the efforts was apparently not visible to the farmers, and neither had it been emphasized in the communication with the farmers.

The results showed that farmers did not feel involved in the implementation of the individual activities related to the BSSP, not even when it involved changes affecting their own farm, although some of the activities were highly appreciated by some of the farmers.

At the same time, it seemed that the way in which the BSSP was implemented did not take into account how traditional beef-cattle farming worked in practice. The results showed that farmer families faced many challenges in their daily lives, and they also faced a number of further challenges if they wanted to improve their beef-cattle farming. For instance, in this study some farmers said that they had difficulties in getting more feed, especially in the dry season, especially as they could not afford to buy it. One example of this is the way in which artificial insemination (AI) took place: the extension agents came to the farm but sometimes at times when it was not relevant to inseminate the cows, or, when it was relevant, it took days before the extension agents were available, and then the chance for successful AI had disappeared. According to Lewis and Mosse (2006), policy-makers are responsible for generating development projects that fit with the actual conditions and which are realistic to implement in practice. In other words, it is important to understand how a government programme is perceived by the community in which it is going to be implemented. The farmers need to be clearly involved in the development of the changes that are to take place on their own farms (White, 2014). This is, however, not the only level where farmers need to be involved and prioritized in matters concerning their own farm, as farmers should also be able to take the initiative as participants by actively engaging in giving feedback to help improve policy (Thornley, 1990). This is valuable for the further development and implementation of policies that can be more effectively implemented (Li, 1999). Hence, we can argue that the BSSP is currently implemented in a way that creates a risk of not meeting expectations, which put simply, is beef self-sufficiency, as is clearly expressed in the title of the programme.

This leads to arguments about the importance of farmers' empowerment within the governmental policy programme. An empowerment process would focus on peoples' ability to take control over own life situations (Perkins & Zimmermen, 1995). In this case, a suitable empowerment process would also develop the farmer families' capacities to take an active part in the practical implementation of this governmental programme. If the farmers were involved in a process of analyzing their own situation and developing strategies to improve it, and could gain a greater insight into this programme, they could then maybe improve their situation and consequently the beef-cattle production on their farm by selecting the services that most suited their particular situation.

4.2 The Government Introduced a Programme—the Farmers Experienced 'Some Activities'

According to our key information source at the LFO (the head of the Livestock and Fishery Offices), the extension agents received the most information and training about the BSSP, e.g., at monthly meetings held by LFO, as well as training and courses related to farming systems. The LFO officer also gave feedback and advice to the extension agents regarding their daily working practices. However, the farmers claimed that the extension agents did not provide them with sufficient information, and that therefore they had little chance to participate actively in the programme implementation, even on their own farm. Moreover, this suggests that government workers need to build an effective communication with the farmers, not only with better information exchange but also a better understanding of their situation. According to Leeuwis (2004), communication with the farmer is about more than just exchanging information, it also requires better understanding a person's situation, which then enables resolving differences, and building trust and respect (p. 86). This involves the process of listening, utilizing also non-verbal communication, managing stress, and having emotional awareness. Effective communication between an extension agent and farmer could improve the implementation of BSSP, because the farmers could take ownership of how the activities and visions of the BSSP are implemented on their own farms. Effective communication between an extension agent and farmer would help to elicit change, generate action, create understanding, and inform or communicate a certain idea, in this case to help improve the implementation of the BSSP. Jansen, Steuten, Renes, Aarts, & Lam (2010) studied the process of communication in a Dutch national mastitis control programme, and concluded that different types of farmers needed to be approached in different ways and through different communication strategies. Effective communication with farmers is essential in order to help them understand how they can improve their farm management. In the case of the beef-cattle farmers in Indonesia, group meetings were one effective mechanism for increasing communication with the farmers. Clearly, good communication needs the active involvement of the extension agents and would benefit from giving practical demonstrations of new technologies to farmers, and encouraging them to have greater interaction with colleagues who may be more experienced in the use of different technologies. Mee (2007) points to the need for long-term communication strategies and that there is a need for veterinarians and extension agents to play a proactive role in order to reach the farmers more effectively. Governments need to be proactive with respect to the farmers and they need to have sufficient communication skills to reach the farmers (Mee, 2007).

4.3 Lack of Coordination among Government Institutions

The study also revealed that farmers perceived that there was a lack of coordination among government institutions. According to the farmers, the implementation of BSSP was not well coordinated. This seemed to contradict the approach outlined for the BSSP and how it should ideally be implemented when it was set up, as the original regulations stated that government institutions have both an opportunity and an obligation to engage in collaboration (the Regulation of Indonesian Department of Agriculture No. 19, 2010, concerning the implementation of the beef self-sufficiency programme). Mattessich, Murray-Close, & Monsey (2001) define collaboration as a mutually beneficial and well-defined relationship entered into by two or more organizations with a commitment to a set of common goals, a jointly developed structure and shared responsibility, and mutual authority and accountability. The collaboration and relationships between government institutions should enhance the ability of the parties to achieve qualitatively better outcomes in the implementation of the BSSP.

In addition, Mosse (2004) stated that one of the key elements to the successful implementation of government policy are the interactions and collaboration among the relevant actors to work together in the implementation of the policy, while Li (1999) also mentioned that a programme's success depends upon the active enrolment of the actors, including the active participation of the community. The implementation of a policy will be most likely to be successfully achieved when the programme can create collaboration between the relevant actors. Importantly, for successful implementation of BSSP as a rural development programme in Indonesia, the ideal situation would be that different actors play different roles—for example, the Ministry of Agriculture taking a different role to the Ministry of Trade—but creating synergy and enabling the governmental workers from different ministries to cooperate continuously and to focus on the same goal and thus allowing them to supplement the actions of each other in a complementary way.

4.4 The Role of Farmer Groups

The findings in this study showed that the role of the farmer groups was important, and that the performance of beef-cattle farmers in Indonesia was influenced by farmer groups. The study also indicated that farmer groups played an important role in implementing activities related to the BSSP and other activities that could improve the farms and their participation in the development programme, according to the interviewed farmers. This argument is related to research about empowering smallholder farmers in markets in eleven countries. Ton, de Grip, Lançon, Onumah, & Proctor (2014) argued that the farmer group helps to increase coherence in advocacy priorities and influences decision-making on key policy issues. Hence, it is important to the implementation of the BSSP that the farmer group should be engaged with to stimulate and facilitate the participation of the farmers to contributing to the advocacy process, together with other actors at the government level in the design and monitoring of development policies.

An effective way to communicate information to the farmers was by giving information through farmer groups. In the case of the BSSP, farmer groups could stimulate members to improve the performance of beef-cattle farming by providing knowledge and information about farming systems. The information itself may not help the farmers learn how they could act to improve their own farm practices, but the group discussions and the visits to each other's farms adds to this element,

permitting group members to obtain concrete help on how and what to do in practice on their own farm.

Based on the results, members of the farmers groups tend to trust each other and a greater ability to interact as an individual or a group or with other stakeholders to improve farmers' ability and desire to participate in decision-making. The group members showed trust in farmer groups and were found to be strongly motivated by success and for finding solutions to problems. Lavado, Rodríguez, & Medina (2010) stated that one successful development of sustainable agriculture depended on the effective interaction and sharing of knowledge and experiences among farmer communities. Farmers were encouraged to share their knowledge in order to promote knowledge sharing and programme improvements. This also helps in building mutual understanding and trust, which then often leads to collaboration and joint actions. Farmer groups can enhance collaboration by creating activities for members to improve the manner of cooperation (Lavado et al., 2010). This study suggests that working in farmer groups leads to social capital, as explained by Putnam (2002), who refers to social capital as social organization, involving trust, norms and networks that can improve the efficiency of a society through facilitated coordinated actions. We can argue that trust, norms, and networking among the farmers can improve the efficiency of society, such as by participation and trust in others helping to facilitate cooperation for mutual benefits. In the case of BSSP, farmer groups facilitated improving the social capital aspects in the farmer community.

4.5 The Policy Target over Self-Sufficiency

The main goal of the BSSP for Indonesia was to become self-sufficient in beef supply and to be able to provide affordable food to its citizens, and in this way to contribute to the food security of the Indonesian population. 'Self-sufficiency' was defined by the Indonesian government as the country being able to produce 90% of the demand for beef consumption (The governmental regulation of the Indonesian Department of Agriculture No. 19, 2010). To make this more concrete, the Indonesian government also had a target to increase cattle population to 14.6 million by 2014 (The governmental regulation of the Indonesian Department of Agriculture No. 19, 2010), with this target being set at the initiation of the BSSP (p.2). However, with increasing population pressure and changing consumption patterns, it can be difficult to set, let alone to reach, goals of self-sufficiency ten years ahead, especially as the consumption patterns are unknown and are furthermore open to market forces. A policy on 'self-sufficiency' necessarily has to include a critical analysis of the consumption pattern. The 2011 livestock census reported that the target was achievable with a cattle population at 14.8 million. In the same period, the prices of local beef meat continued to increase (Permani, 2013). Moreover, based on the results from this study, it can be seen that smallholder farmers are still struggling to improve their productivity. This means that the beef self-sufficiency policy was not simply about putting a target on adequate cattle numbers in place, but also needed various policy elements to be considered, such as how will the policy target be reached, which programme resources, personnel, administration, and general organisation are needed in order to implement the programme, and how and when will the policy be terminated? Agriculture policies like BSSP need to take into consideration not only the policy content but also some organisational aspects. Strengthening the implementation of policies and obtaining feedback from the target communities and the other relevant actors is also needed.

5.0 Conclusion

The farmer families in this study normally did not have many resources. Also, the lack of education in cattle farming was a major challenge for the farmer families who wanted to improve their performance in beef-cattle farming. The farmers generally felt to be in a weak position in terms of their bargaining position in trading and marketing. Most beef-cattle farmers in the area wanted to join a farmer group, which provided them with better access and services and that stimulated the farmers to become socially active in their daily lives. The farmers had not perceived that the BSSP, as introduced to them, was a whole programme, but rather viewed it as individual elements, such as feed subsidies, a vaccination programme, and artificial insemination. The farmers obtained the information about BSSP partly from the television, and this had further confused them into seeing the BSSP not as a program to improve the cattle production system in Indonesia, but rather as a policy solely aimed at reducing imports. The interviewed farmers considered that the implementation of the BSSP was not well coordinated between the different government offices. The analysis in this study did not reveal the underlying causes for this, since it only looked at things from the farmers' perspective, e.g., whether the fact that the farmers did not know or understand the BSSP was due to lack of transparency or dissemination efficiency. Under all circumstances, this suggests that the implementing authorities should be encouraged to involve farmers at all stages of a policy implementation process, from planning, through implementation and finally with post-programme evaluation. The interviewed farmers felt that the BSSP did not offer them solutions that were useful to improve their life situations, including their incomes from beef production. In this case, where a number of activities were offered, it would seem fairer to the farmers to have given them an informed choice between activities. The findings of this study point to the importance of gaining the involvement of the farmers and encouraging them to take ownership over their life situations. The findings, therefore, could potentially serve as a guide for directing the present and future beef-cattle development, with a special emphasis on understanding farmers' perceptions.

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5.2. Paper 2

Bridging Expectations: Extension Agents' Perception of a Gap between Expectations and Experience when Implementing the Indonesian Beef Self-Sufficiency Programme

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Bridging Expectations: Extension Agents' Perception of a Gap between Expectations and Experience when Implementing the Indonesian Beef Self-Sufficiency Programme

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Abstract

Beef self-sufficiency programme (BSSP) was launched in Indonesia in 2004 in response to the massive import of beef from Australia and New Zealand. The objective of the present article is to explore and discuss how Indonesian extension agents perceived the practical implementation of the programme, including their own and others' expectations of their role in the implementation, as well in the programme. Semi-structured qualitive interviews of 14 extension agents (11 males, 3 females) were conducted during December 2013–January 2014 based in the Semarang Regency, Central Java Province, Indonesia. The extension agents experienced that although the BSSP was supported by the government with a number of diverse activities such as support for artificial inseminations and concentrated feed stuff for farmers, there was no coherent support regarding how to distribute these benefits, disseminate knowledge or assist farmers on how to increase production in their farms and how to balance this with other farm priorities. They generally felt squeezed between – on the one hand – the government's expectations of their implementation efforts and efficiency, and – on the other hand – the farmers' expectations on availability, assistance and donations. The practical framing of and conditions for their work did not seem to match the expectations from either party – neither the farmers nor government. The BSSP was closed in 2014. Referring to their experiences, the extension agents questioned the long-term impact of the programme, the future of self-sufficiency regarding beef production in the country, and how this learning could be captured and used for the future.

Keywords: Extension agent, expectations, Indonesian beef self-sufficiency program, policy programmes

Introduction

Extension, in a learning context, is the ongoing process of getting useful information to people and assisting them to acquire knowledge, skills, and the right attitudes to utilize this information and technology effectively. The agricultural extension service is mainly seen as the process of exchanging knowledge and technology between the extension agent and the farmer. Extension services have played a key role in terms of improving knowledge at the farm level and helping to deliver government agenda to the farmers (Leeuwis, 2004). Overall, agricultural extension is defined as the systems that facilitate the access of farmers, their organizations and other market actors to knowledge, information and technologies in their field; facilitate their interaction with partners in research, education, agri-business and other relevant institutions; and assist them to develop their own technical, organizational and management skills and practices (Christoplos, 2010).

The concept of extension has evolved over many years; during a long initial period, it was quite limited and just involved transferring and disseminating ready-made knowledge from research to farmers, or from 'early adopters' to fellow-farmers (Labarthe, 2009). Nowadays, the extension service incorporates a broad range of different approaches, with the aim of not only at supporting farmers but also developing advisory services in viable ways. It requires a consideration on how to improve the methodological approach to the farmers, manage the skills of the extension agents and

a better management approach at the government level to facilitate the interaction between different actors in the agriculture sector (Faure, Desjeux, & Gasselin, 2004).
Chambers (1997) mentioned that the rural development paradigm, including extension services, implies and demands changes that are institutional, professional and personal. This could imply that the government needs to set concrete, specific and well-motivated goals for their policies, and to support the extension service bodies. Chambers also argued that this needs not only a long-term perspective, but also new methods and approaches to learning; for example, greater appreciation of the importance of the empowerment process in rural communities. Empowerment emphasizes the role of the extension agents to help people not only to express and analyse their situation, but to plan and act accodingly in order to improve their capabilities in the rural community.
Extension agents are described as social workers who regularly interact with citizens in the course of their jobs. Lipsky (2010) emphasized that they should respond to the individual needs or characteristics of the people they serve or confront before taking action . In practice, extension agents not only have to deal with government structure and regulations to achieve the policy objectives originating from the political process, but they also need to use their knowledge and experience to deal with farmers and community situations that require improvisation and responsiveness to individual cases. Furthermore, they may face challenges to fulfill the aims of a particular government policy, which could potentially call for a fundamental change in standard practices based on local traditions or local conditions in the community.
In the case of an Indonesian context, the extension service was initiated by the government based on the Extension Law No 16/year 2006, which stated that extension agents are representatives of government agencies, responsible for introducing government policies and promoting new information and useful knowledge to the farmers. In addition, extension agents could facilitate feedback to government on the agriculture national programme (Kementerian Pertanian Republik Indonesia, 2006). According to Herianto, Wastutinigsih, Foster, Rimmer, & Callinan (2009), later, the central government in Indonesia initiated a process of transferring responsibility and funding for extension services to the provincial governments. The reasoning behind this was to replace the existing top-down approach with a linear research-extension-farmer relationship with a more bottom-up, participatory approach and referred to this as an “autonomy policy”. However, a wide gap remains between local and national government perspectives on the importance and roles of agricultural extension services. Also, the extension service has faced problems related with a lack of resources, budgetary constraints and the autonomy policy (Heriyanto et al., 2009). Much district-level funding is allocated to routine programmes, such as paying the salaries of government employees rather than agricultural development and its extension activities (World Bank, 2002). This means only small funding is actually allocated for extension services; for example, for facilitating networks between extension agents and researchers or for improving the skills of extension agents. In 2004, the Indonesian government implemented the beef self-sufficiency programme (BSSP), which aimed to make the country self sufficient in beef production by 2014 (Kementerian Pertanian Republik Indonesia, 2010). The extension agents were expected to take part as important actors in this policy.

Objective

The aim of this article is to present, explore and discuss the role of extenstion agents in the implementation of the Indonesian BSSP. The research results were based on semi-structured qualitative interviews carried out with extension agents based in the Semarang Regency, Central Java Province, and focused on how extension agents in Indonesia perceive their own role and working conditions, specifically in relation to implementation of the Indonesian beef self-

sufficiency programme and how extension agents can bridge the expectations of the farmers and the government, which originally launched the BSSP.

Methods

The research approach and interview method

This study was based on individual semi-structured qualitative research interviews. The qualitative research interview is a method that aims to explore and describe a phenomenon through the interviewed persons' experiences and perceptions, as well as their motivations and backgrounds. The aim of such a study is to understand a field better, rather than just to quantify opinions or experience among a certain group of people.

Data collection

All the interviews were based on an interview guide that was designed in such a way as to encourage the interviewed persons to tell their stories in their own words. Data was collected during December 2013–January 2014 in the Semarang Regency, Central Java Province, Indonesia. The head of the Livestock and Fishery Office was approached as a key informant, who facilitated contact to all fourteen extension agents (eleven males and three females) under the Livestock and Fishery Office. Table 1 shows the characteristic of the participants. All the informants were interviewed in the Bahasa Indonesian language.

Table 1
Characteristics of the participants

Extension Agents	Gender	Age
Participant 1	Male	41
Participant 2	Male	39
Participant 3	Male	31
Participant 4	Male	35
Participant 5	Male	55
Participant 6	Male	48
Participant 7	Male	43
Participant 8	Female	35
Participant 9	Male	35
Participant 10	Female	45
Participant 11	Male	31
Participant 12	Female	31
Participant 13	Male	29
Participant 14	Male	38

Data editing and analysis

All the interviews took 50-70 minutes, and were recorded using a digital voice recorder, transcribed in full and coded using the software program *Transana*. The interviews were analyzed using a modified grounded theory method based on Bitsch & Hogberg (2005), in which the whole text was organized into small statements after transcription of the interviews. The modified grounded theory approach was used because the goal of this study was to generate a model of understanding that helped explain and give insights into the phenomenon of 'how the extension agents perceived the implementation of the BSSP'. The purpose of the grounded theory approach was not to test existing theory, but rather to identify themes and categories, in order to develop the aforementioned model of understanding inductively, through interpretations made from the raw data. The analysis process began with transcribing the interview data. This was followed by an axial coding, with the aim

being to transform the data to a manageable text and to organize the text in themes. Throughout the process, new codes emerged, which also changed the coding framework. This process was used to develop categories, which were then conceptualized into broader themes. In this article, two main themes were identified based on the coded text bites and a series of sub-themes, which altogether formed and were linked to the main themes, as explained in Figure 1 in the results.

Results

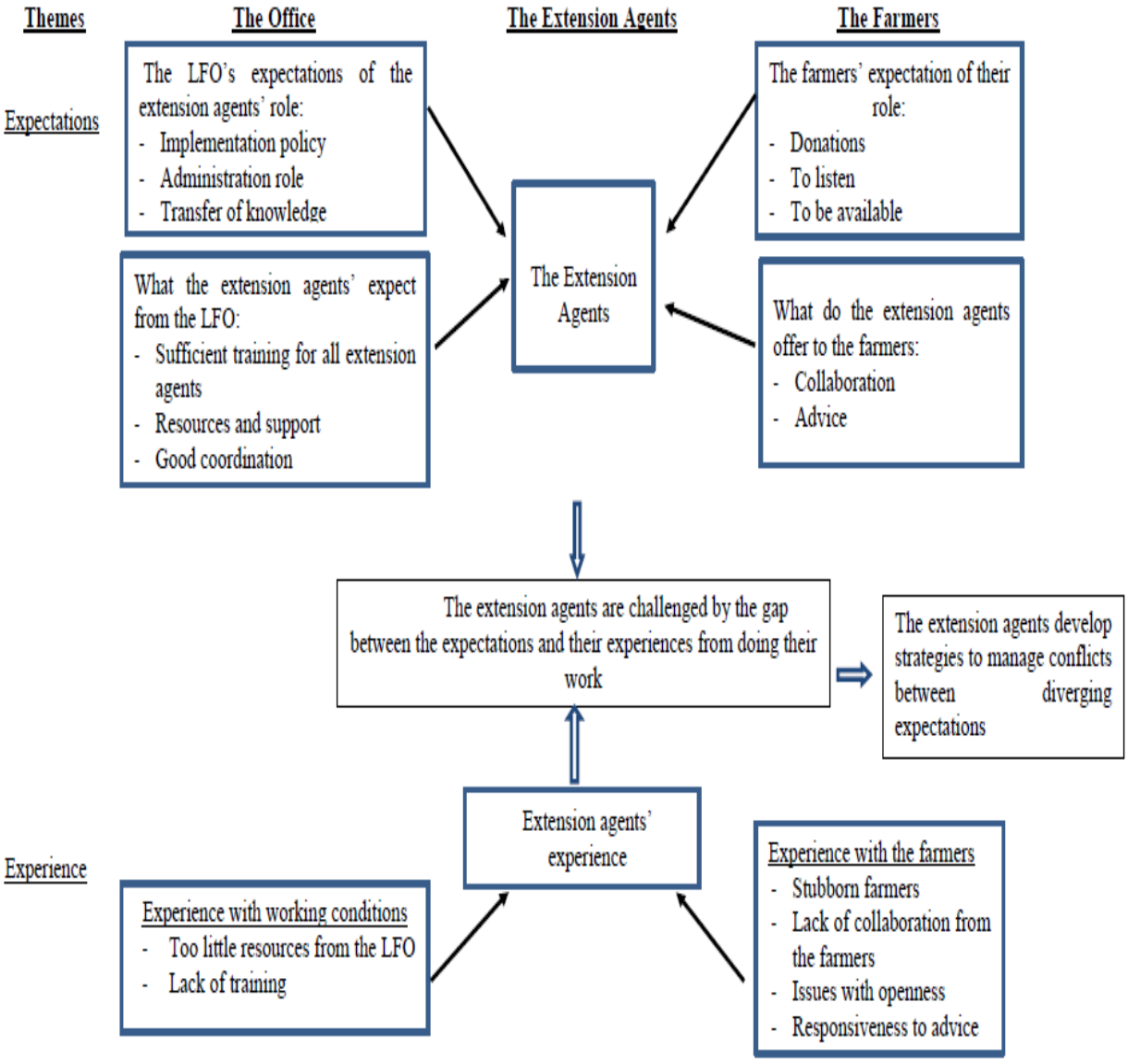

Figure 1. Results of the interview study with extension agents from 19 different districts. All the expectations and experiences are seen from the extension agents' point of view.

The results of the analysis are shown in Figure 1. The themes give a picture of the extension agents' perception of their own role and working conditions in relation to implementing the Indonesian beef self-sufficiency programme. The first main theme, 'Expectations', consisted of 4 sub-themes, all about mutual expectations between the Semarang Regency Livestock and Fishery Office (LFO) and

the extension agents, as well as between the farmers and the extension agents. The second main theme, 'Experiences', consisted of extension agents' perception of their working conditions and their interactions with other actors in relation to beef cattle farming, e.g. the LFOs and the farmers. The arrows, as can be seen from Figure 1, show pressure on the extension agents. In their own view, this pressure affected their work and caused a feeling of a gap existing between the expectations on them and the actual experiences they encountered when they did their work in the field. As a response to these pressures, they developed strategies to manage conflicts and this gap, which they felt existed between expectations and their experiences. In the following, these themes will be elaborated with concrete examples from the interviews.

Expectations from the Livestock and Fishery Office (LFO)

The extension officers highlighted three main areas of expectations from the LFO to their role: 1) to represent the BSSP programme and the government policies generally, 2) to transfer knowledge and information to the farmers, and 3) to have an administrative role.

The extension agent's emphasis on representing the BSSP programme and government policies generally meant that they were responsible for introducing government programmes like the BSSP. Extension agents also did practical work, such as visiting farmer groups to inform them about programmes initiated by the government. Participant 11 explained they were given responsibility for the practical implementation of the government agenda, e.g. by engaging farmers in activities initiated by the government, such as artificial insemination programme and by providing assistance to the farmers. At the same time, extension agents provide information and feedback to the government about the current condition of the beef sector as well relaying farmers' concerns to the LFO related to the activities initiated by government. After having been introduced to the BSSP by the LFO in 2004, the extension agents were expected to introduce the BSSP to the farmers at an initial farmer group meeting. However, the extension agents said that, in reality, at the time, they had not felt able to explain the whole programme, including its overall aims, to the farmers, because of the low educational level of many of the farmers and due to time constraints. Therefore, the extension agents had only explained a little part of the BSSP, typically around the activities that they had learnt about at the LFO information meeting that were in focus and planned for each particular area, such as the feeding programme or the programme about live cattle donations. This was summarized by Participant 12 in the following way: "We were responsible for making make sure that the farmers were obtaining services or that we were resolving complaints and providing information to the farmers regarding governmental functions or agriculture services related with beef-cattle farming. We have a function as spokespersons for the government because we worked directly with the farmers and are always in touch with the farmers".

At the same time, the extension agents did not feel that they had substantial decision powers over policy development, like they had no influence on the implementation of the BSSP. This point was emphasized by Participant 4, who added that the LFO lacked the full information that was necessary to improve the programme and target direct activities in order to reach the most vulnerable farmers.

Participant 3 expressed their feelings regarding the implementation of the BSSP. He agreed with the government programme's aims for the nation to become self-sufficient from 90% of domestic production, but questioned why there was no estimate goal on how much a particular district should produce to contribute to BSSP. Many programmes, like the feeding programme, were initiated even before the implementation of the BSSP. He added, that for the monitoring and evaluation of the BSSP, extension agents had the responsibility to report on the total population in a particular area as well as what kind of activity they had done over the year, but in return, he never received any detailed evaluation of the implementation of the BSSP back from the government. Participant 3 questioned whether the implementation of the BSSP would continue in the long run.

The extension agents expressed that they felt that they were pulled in many different directions on a daily basis to do a lot of different activities, such as visiting farmers, answering phone-in questions, doing research to be able to answers farmer enquiries, planning programmes, preparing presentations and educational material, adjusting material before disseminating it, and meeting with the LFO and other stakeholders. However, one really time-consuming thing was the level of paperwork and report writing. They referred to this as their administrative role for the LFO. Participant 7 said that their days were full of paperwork: "In every first month of the year, we were busy preparing the annual extension plans (*Programa*) and then, at the end of the year, we needed to submit reports of the annual evaluation work, and there were also quarterly progress reports and the submission of monitoring reports about the current situation of the farming system in our area of work".
As part of this reporting, the LFO expected the extension agents to provide information about the current situation in the field, such as the total number of livestock, as well as gathering information about what farmers' needed to improve their farming systems.

The extension agents' expectations of the LFO to support extension services
The extension agents' expected the LFO to support extension services by providing them with training, information beyond the monthly meetings and resources. The limited resources not only led to a lack of training and other resources, but also created conflicts in the group of extension agents, as explained by participant 14: "There were training and courses related to farming systems offered by the central or provincial governments. It was good for us to improve our services to the farmers. However, we are 14 extension agents and it seemed that there were jealousies among us, because only a few extension agents could attend the courses. I wish the LFO could have facilitated courses for all the extension agents". He added that during the courses or workshops, they received information not only about farming systems but also information about new policies and regulations, such as the implementation of the BSSP. Resources such as operational and transport fees, multimedia tools (for example, computers, the Internet, projectors), and more literature were also very scarce. The interviewed persons had difficulties in contacting experts and saw an unused potential in facilitating networking with universities or researchers, which was not exploited by the LFO.
The extension agents furthermore experienced a lack of coordination among government staff in the LFO in relation to the implementation of the BSSP, and which was highly demotivating e.g. for working together. According to Participant 7, this might happen because many government staff did not clearly know their job description, and they were constantly multitasking. When asked "what problems did you see in terms of coordination among the stuff?", they immediately replied: unclear, multiple, conflicting and uncooperative. Participant 13 said: "Lack of coordination among us in the LFO is concerning. It happened many times when we had activities or extension services involving many staff members. In my opinion, the LFO needs to integrate a process that creates trust and openness and allows coordination throughout the LFO between government staff".

Experience of expectations from the farmers
According to the interviewed extension agents, the farmers expected a wide variety of services from them, such as access to donations, availability at all times and attentiveness towards farmers' concerns. The interviewed extension agents experienced that most farmers thought that the extension agents always knew how to solve their problem, and the farmers wanted to get the answer as soon as possible. They had to react to this, e.g. like Participant 12, who added: "I did not need to be ashamed when the farmers had questions and I couldn't answer the question. I just told them that

I don't know but I'll try to find out, because he also saw it as their responsibility to help them to find out the answer to their question".
Participant 13 added that he had experienced that he was expected by the farmers to listen to their concerns and challenges, for example regarding the *blantik* (the middle man in trading with the cattle) or in cases of increased feed prices, and then to pass on their concern to the LFO, thus acting as a kind of liaison between the farmers and the LFO.

The extension agents' perception about what they want to offer to the farmers
The extension agents focused mostly on advice and collaboration with farmers when they spoke about their own wishes on what they could and wanted to offer to famers. The BSSP included several individual programmes such as feed subsidies, an artificial insemination programme, a disease prevention programme, live cattle donations and providing loans to the farmers. Participant 6 mentioned how supervising a farmer group facilitated farmers' access to loans significantly, because numerous papers were required to complete the bank loan requirements, but in general, they saw their role as somebody who was available for the farmers, when called on to help in all kinds of matters. Participant 2 told about the great importance of building trustful mutual relationships with the farmers. He believed that such relationships existed because the farmers could get benefits from the extension services to improve their farming system. A good relationship, in which the extension agent could help improve the farming systems and introduce the governmental programmes "justified" their existence, so to speak. Good relationships though needed effective collaboration with the farmers, and the extension agents were also aware that it helped improve the farmers' active participation and helped them to take an interest in and ownership over government programmes such as BSSP. Participant 7 also mentioned that he expected attention and trust from the farmers when delivering extension services.

Challenges experienced in the field
Apart from a multitude of conflicting expectations as outlined above, many extension agents faced general challenges related to their jobs, e.g. in terms of too much travelling, as for examples illustrated by Participant 3: "I have worked as an extension agent for almost 20 years. I have helped the farmers by providing them with practical information while bringing their concerns to the LFO. Delivering these services in a huge geographic area with a limited travel budget and staff, that was a challenge. We had to develop a strategic plan to guide our efforts to address the issues that the farmers faced, while maximizing our limited resources". Although the government provided additional resources to buy gasoline, it did not fully cover the expenses. Most extension agents used their own motorcycle, which also implied repair costs. In addition, some extension agents sometimes had used their own money to buy snacks or cigarettes to facilitate good contact with the farmers, even though they realized that this might not facilitate the dialogue, but was more to just attract attention.
Some of the extension agents told about their experience with the farmers, and said how they sometimes saw them as stubborn and not collaborative. However, one extension agent gave an example of how she had initially seen farmers as stubborn, but then changed her practice regarding the extension service: "I often asked myself: Why don't farmers use our information more often? I've gone to their meetings and presented my idea, but they still did not seem to want to hear what I have to say, or to follow my advice. Then I realized that understanding, dialogue and shared knowledge were key elements. Consultation, rather than giving instruction, was a central component of facilitating farmers' decisions" (Participant 8). This extension agent had changed her practice, so that now when she gave advice to individual farmers, she based it much more on dialogue and questions to the farmers about their perception and practices, compared to what she

used to do, and she felt that the results were now better. She emphasized that the collaboration with farmers was really important, and maybe even especially so during the planning phase of the extension services in a particular area. The normal practice is that extension agents plan the implementation of their extension services, without involving farmers, so this would mean a completely different approach.
Other extension agents gave examples of present challenges where they did not feel that the farmers addressed important issues sufficiently, e.g. sanitation, cattle diseases, reproduction and feeding practices. They mostly explained it being due to the low education in farming systems and practices. Participant 7 told: "It was my task to help the farmers and provide advice for them to better manage their beef-cattle farming, but sometimes their responses were beyond my expectations. For example, according to them our advice was too expensive or they were too lazy to follow it, because it required resources and time. I could see their cattle looked skinny and malnourished. Of course, this condition will not increase their income and resulted in poor performance of the whole farming system".
Other extension agents had positive experience with working with the farmers, and experienced that most of the farmers were very cooperative, open and responsive to advice. Participant 14 told for example: "I enjoy working with the farmers. They are humble and help each other, even sharing costs to buy feed for their cows. Mostly, I have a great time working with the farmers, who are friendly and responsive to the advice as well as to the government programmes. It was important to know them personally and it took time to develop trust with the farmers".
He gave an example of how he collaborated with the farmers and found it important to listen to them in order to help them find ways forward: "Whenever the farmers need advice, I will sit and listen to their problem, so that then I can help them formulate what it is they really need, not what I perceive they should do. This means to help them to take action. Many of them were open-minded for farm-management improvement. However, some of the farmers were not open-minded to advice because it was not sufficient for improvement".

Challenges related to government donations. The extension agents faced challenges related to donations, where they had to attempt to work together with the farmer groups to ensure that all the farmers were involved in governmental donations. This was important to avoid jealousy and internal conflicts among the farmers, but was sometimes difficult, and they had to involve the village leaders. Some extension agents also realized that donations from the government made the farmers dependent, as, for example, was explained by Participant 11: "When we had a farm visit or group meeting, most of the farmers always asked about when will they get a donation again. I can see right now, they were more or less dependent on the donation. As an extension agent we were trying to educate them to be self-reliant and to analyze their own problem to realize how to solve the problem related with the farming system. Even though I realized they obtained benefit from the donation, they always seemed dependent on the donation, which was not very helpful for the farmers to improve their productivity". He gave an example on how he had tried to make farmers more independent of feed donations. He helped the farmers improve the palatability and nutritive value of rice straw by chopping and soaking it in water or a salt, which slightly increase feed intake and its digestibility.

Challenges of being a female extension agent. Three of the interviewed extension agents were females. They found it challenging to combine their role in extension services with their roles as housewives. Their jobs required travelling over large distances. On the other hand, their responsibility as a housewife did not allow them to do many activities, especially in the evening when farmer groups normally arranged their meetings. Participant 10 told: "It was difficult for me

to travel in the evening, I felt unsafe; it was too dark and a bit dangerous for a female to travel alone, but that was our work. I would ask my husband or my colleague to accompany me during the visit in the evening. I felt *so* guilty to my children, with my workload I couldn't stay with them all of the time, often coming back home quite late, still doing paperwork after arriving home. I felt I performed poorly, compared to my male colleagues".
The female extension agents also explained about difficulties in communicating with the farmers. They told how farmers (who mostly were males) would have a closer relationship with the male extension agents, and sometime the farmers did not take their advice seriously. According to Participant 12, many farmers felt that male extension agents were more experienced than female extension agents.

Working with farmer groups. The extension agents faced a different type of challenges when they were working with farmers in a group, compared to working with individual farmers. They had to make sure that everyone was involved in all group activities, and that certain members' specific own interests or voices did not dominate. Furthermore, they sometimes had difficulties in reaching decisions, for example regarding distributing the donations and this could result in internal conflicts, which made some of the farmers lose interest in participating in the farmer group.

The gap between the perceived expectations and the challenges
The gap that has been explored in this study focused on the conflict between, on the one hand, the expectations which extension agents experienced from the LFO and the farmers, and on the other hand, working in the field and not being able to meet these expectations for a number of widely different reasons, as mentioned above. In this sense, according to Participant 13, the extension agent needs to realize the gap exists, and to overcome their administrative role so they could focus more on the dialogue with the farmers. According to more of the extension agents, the low level of education among farmers required a certain way of communicating with them to make the farmer understand their advice, and to explain their needs, and this also required special skills in communicating, which they as extension agents had not had as part of their education.
Also, the huge areas covered by each extension agent made it very challenging. There were 14 extension agents to cover the whole of the Semarang Regency, which consisted of 19 Districts. They emphasized that in their daily routine, they faced many tasks, including planning, reporting, monitoring, dealing with new laws, visiting farmers and contacting stakeholders. On top of this, a number of tasks were called 'additional', such as assisting and supervising the farmers to make financial reports when the farmers got donations from the government in terms of live cattle, feed support or money.
Participant 6 told: "The farmers need our help to make reports regarding the donations. It was very irritating and hard work, helping them to work with computations, a computer and the receipts. And imagine, my area covers 19 villages, I had to travel from one village to another village and spend the day with them. While, on the other hand, I had many things to do or others tasks that I needed to finish. It was not our main task, but we had no choice. We needed to help them with the financial report, otherwise the farmers would get into trouble in the future. Although, in reality, I wanted to focus more on the dialogue with the farmers. For me, the important thing in our job was dialogue with the farmers, helping them to cope with their farming problems …".
The semi-structured interviews also opened up aspects on the importance of being a government employee, because it is a relatively secure job. Participant 3 observed that some colleagues did not put more effort into the extension services as they said they would still get paid "without doing anything", suggesting that those colleagues thought that it did not matter because they would still get salary every month. Indeed Participant 3 also speculated about the consequences of this when

there was a lack of effort from extension agents in giving services to the farmers, saying: "We were working for the government, we get salary every month. This system can also have an indirect effect on the work such as we did not put much efforts to supporting the farmers, as long as we did activity based on the *Programa*".
Moreover, Participant 5 explained about the different perceptions between senior extension agents and the younger generation of extension agents. One of the senior extension agents argued that their younger colleagues put less effort into developing communication with the farmers.
Participant 5 told: "… building trust and ways of communicating with the farmers is not something we can do in one day. It takes time and energy. However, the development technology right now makes everything easier but it is important to visit and communicate with the farmers face to face, not only by phone. I observed that there was a communication gap between the farmers and the extension agents, especially the younger extension agents. They were not very communicative and less concerned about the farmers' situations".

Extension agents' strategies
The semi-structured interviews also revealed information about the extension agents' strategies to support their work in the implementation of the BSSP. According to Participant 7, building networks with other stakeholders is very important, such as village leaders, co-extension agents and researchers. This involved building trust and a good relationship with the village leader or community leader in order to receive more information on working with the farmers. Village leaders can help extension agents to identify farmers' needs. In order for the extension services to function effectively, extension agents need to meet with the village leader periodically, listen to their advice about current extension programmes and get their input on future programmes. Moreover, listening to the experience from extension co-workers was also very important in order to get assistance from them. Also, collaboration among extension agents was very important, because it could help to more efficiently carry out extension services and administrative duties, such as budget planning and marketing extension in the farmer community.
According to Participant 8, being an agent means being a leader. It also means learning new things to better serve the farmers. It is important for the extension agents to identify their own learning needs in order to take advantage of professional improvement opportunities. In order to enhance the learning and professional development of extension agents, the LFO have sent extension agents to attend workshops and courses related with organizational improvements and cattle farming. The agents also actively search out additional information about farming systems through use of the Internet.
Based on the semi-structure interviews, an important strategy for extension agents is good communication and interaction with the farmers. These are probably invaluable for building trust between the agent and the farmer. It also can be said that the extension agent must realize that the personal influence of the extension agent can be a critical factor in helping a farmer with their farming problems, and can also be instrumental in getting the farmer to participate in extension activities or other government agriculture programmes (Participant 1).
Meanwhile, another effective method for good interaction and dialogue during extension services is communicating with farmer groups. This method makes it easier for the government to provide services to the farmers. Providing services to farmer groups is more effective than to individuals, as more people can be served at the same time. Part of the government's tasks can be taken over by improving the role of farmer groups, such as the transfer of information, or the distribution of live cattle and cash money as part of donations from the government, providing loans, vaccination of animals, developing demonstration plots, etc.

Participant 1 emphasized with the role of extension agents as educators and facilitators. The extension agents need to facilitate knowledge sharing through collaborative, experiential learning instead of relying on instruction. The demand for detailed knowledge of local conditions and farmers' characteristics is important when an extension services is initiated. Consultation, rather than giving instruction, is a central component of facilitating farmers' decisions

Discussion

Perceived lack of support from the LFO to the extension agents

The semi-structured interview showed that the extension agents felt they lacked support from the LFO in terms of resources and time to deliver their extension services. This was one major challenge in the implementation of the BSSP in Indonesia, and that influenced the motivation of the extension agents for engaging in their work. A study by Karami, Ismail, Binti Omar, Binti Abdul Wahat, & Badsar (2012) proved that organizational support influences achievement motivation. When extension agents felt supported, they increased their efforts to meet the goals of the organizations, and they were more committed. Karami et al. (2012) added that it feeing supported generates a sense of responsibility to pay back the helpfulness of the organization, which is shown through the extra effort of the worked, i.e. the extension agent. The solution to this – the problem of the severe gap between the expectations on the extension agents, and the available resources – can only be solved with support at a higher governmental level. Ferris, Brown, & Heller (2009) added that the supportive strategies of organizations are the most significant contributors to employees' performance. This includes support to attain the work goal and to help them develop professional skills, as well as to develop in general, as extension agents and humans, as well as general support from the leaders in a friendly environment.

Some of the results in this study pointed to extension agents feeling that the communication with the farmers was difficult, and that, for example, the distribution of donations was a difficult task, which often created conflicts in farmer groups. All these issues point to a need for training in skills in communication, farmer group guidance and conflict management, besides their professional training in livestock management. Alibaygi & Zarafshani (2008) suggested that to improve job effectiveness, extension agents must receive continuous training in accordance with identified training needs. In other words, there is a mutual relationship between job satisfaction and the opportunities to having one's educational needs fulfilled. Hammer (1987) suggested that employees provided with opportunities to meet educational needs would be more satisfied than those unable to access training. In many cases, the government offered training sessions for the extension agents. However, the interview results indicated that sometimes this training was not directly targeted at the actual situations that the extension agents were actually confronted with, for example gender analysis.

The extension agents pointed out that the financial support and technical support were not sufficient during the implementation of the BSSP, and that existing resources were not distributed optimally. Like with the training, this could not be solved at the level of the extension agents themselves, but needs the active enrollment at a higher governmental level. In their own opinion, the extension agents performed their roles and provided services to the farmers as well as they could under the given circumstances, but resources were scarce and did not allow them to deliver the level of services which they could see were needed. This was in conflict with the feelings of responsibility they felt to disseminate knowledge from the LFO to the farmers and to serve as the vital links between the government and the farmers.

Furthermore, the extension agents had occasionally observed some lack of coordination among government staff in LFO. Many government activities, like for example the BSSP, as well as extension services, involve different types of governmental institutions, each of which must direct

its own resources. Since each office has to take charge of its own legitimate missions, responsibilities and jurisdiction, each of them uses its own command and control processes, and the result can be, as perceived by the interviewed extension agents, that these uncoordinated efforts result in duplicative and conflicting efforts. They were unaware of what other actors were doing, and seemed – from the interviewees' perspectives – not willing to make an effort to find out and cooperate. This seemed clearly to be an area where improvement could be relevant. Mosse (2004) pointed out that one of the keys to the success of government policy is the interactions and collaboration among the actors to work together in the implementation of the policy, while Li (1999) mentioned that the success of a given programme depends upon the active enrolment of the actors from different institutions and the active participation of the community. This suggests that the implementation of BSSP in Indonesia could have been more successful and thought through, if it had been coordinated with other agricultural- or livestock-related programmes, so that they all pulled in the same direction in a more resource efficient and coordinated way. For instance, one major programme which might have been relevant to coordinate with is the so-called import quotas policy, which was running in the same period as BSSP. The study by Permani in 2011 concluded that the result of a government decision to cut beef import quotas would have long-term impacts on the relative domestic price, which would make local beef more price competitive over imported beef.

Working with farmers who 'expect something' but 'refuse to collaborate'

The result shows that the extension agents faced problems related with their interaction with the farmers. During the implementation of the BSSP, government offered several programmes related with donations, such as live cattle donation or cash money donation. However, the farmers began to rely on the donation, and thus the donation can damage local farmers by making them effectively "unaware peasants" dependent on donations from the government. Farmers are not fully aware on the negative effects of the donation. Some of the farmers also just want a donation and refuse to collaborate with the extension agent.

The extension agents have an expectation in the success of the extension services, not only to provide appropriate services to the people but also to maintain a relationship with the farmers and to build a meaningful relationship with the farmers. They need to be able to listen to farmer's concern, and to what the farmer's want to help them improve their farm. The extension agents are often confronted by farmers with many questions, such as relating to the donation from the LFO. The concern was that the answer needed in ways to help them maintain their relationship with the farmers. It is important to meet the farmers on their own farm to most effectively deal with the issues of importance to them and the priorities to be solved. The extension agents have to accept that farmer' needs are tightly linked to their social context, which are most known to the farmers themselves. Then we can argue that any relationship between government employees designed to work with the farmers should consider certain fundamentals such as a farmer's life situation. Farmers are the only people who can come close to deciding how such the programme can answer their problems (Chambers, 1997).

However, the results show that there is still a lack of participation of farmers in the implementation of the BSSP. It seems the farmers are just expected to take whatever extension agents offer to them. Indeed, most farmers were not aware of existing policies like BSSP. This leads to another argument about the importance of the involvement and dialogue with the farmers. This process will not only increase farmers' participation in the implementation of the policy but will also enhance common understanding between the farmers and the extension agents to build the same perspective and priorities and respond to the farmers' local needs and realities.

Successful implementation of the BSSP needed collaboration between the relevant government institutions and the farmers. Leeuwis (2004) emphasized that the collaboration process is influenced by social conditions, the political situation, leadership and the goals of a programme and must be evaluated in terms of the contribution to goal achievement. Moreover, the importance of communication between farmers and extension agents must be stressed. In some situations, the farmers were articulated the expectations from the government programmes. This is a challenge for extension agents to communicate with the farmers.

Learning from experience: how can expectations and working conditions be bridged?

The study shows that the model of "dissemination" does not involve the farmers very much and still quite old-fashionably sees the farmers as "recipients". The active involvement of the extension agents is needed as well as good collaboration with local people to reach the goal of the BSSP. Moreover, Long (2001) noted that emphasizing listening to the farmers, strengthening the local organization and acceleration of the power injected from outside would improve the development of programmes in order to shift the balance of forces towards more forms of local self-determination. In other words, it is important for government employees such us extension agents to imply the idea of empowering people through strategic intervention to promote development programmes.

The present article has presented a discussion about the gap between the expectations and the experiences of extension agents in performing their duties, while likewise, Lipsky (2010) mentioned that social workers are part of the policy structure in their field, and their decisions on how to carry out their work in the field influence the success of governmental programmes in that area. It is important to improve workers skills by looking at what kind of skills, experience and training are necessary and that need improving. Many extension agents talked about the tension that existed between what they found in the field and their experience of their own organization and expectations on them. Extension services faced similar problems regarding finance, management, technical support and overload with non-extension activities. This should be an indicator for the government to start dealing with these problems in order to create adequate support for farmers, even if this implies a greater investment of economic, human and social capital into the service. Without essential reforms of the extension service, the famers won't be optimally supported.

The main motivation behind the implementation of the BSSP was to make the country self-sufficient in beef (to limit imports to a maximum of 10%), by the end of 2014. However, according to the interviewed extension agents, no formal report exists at any level – from the central government to the Semarang Regency – regarding an evaluation of the BSSP. A report about the number of live cattle in the Semarang Regency was the only report that the extension agents had access to. The data from the Indonesian Statistical Bureau showed that there were an increasing number of beef cattle in the region from 2004-2014. However, there was a different understanding among the various actors at the government level about whether the BSSP had fulfilled its purpose, or not. The detailed calculations did not exist for example of how much each region should produce. The BSSP was closed in January 2014, and based on their experiences, the extension agents questioned the long-term impact of the programme, the future of self-sufficiency in beef production, and how the learning could be captured and used for the future. The aim of the BSSP was to address the country's self-sufficiency of beef cattle to reduce imports and to improve the local supply of beef cattle, and through this, to contribute to improvements in farmers' livelihoods and in the marketing system, e.g. less dependence on the "blantik system". The BSSP looked beyond the agriculture system from producer to consumer. This promoted shared responsibility and a feeling of ownership among stakeholders. The long-term rural development of a programme such as BSSP requires institutional strengthening and the development of management systems in order to build the capacity to gather, share and analyze the local situation.

Conclusions

The paper presents a picture of the extension agents' perception of their own role and working conditions in relation to implementing the Indonesian beef self-sufficiency programme. The interviewed extension agents revealed many aspects of how they felt squeezed between and often unable to meet all the expectations that they perceived the government had on their contribution to the sector and the implementation of the BSSP and on the expectations from the farmers. At the same time, the extension agents did not feel that they had substantial decision power over policy development, and that they had no influence over the goals for the implementation of the BSSP. The LFO planned the implementation, but was challenged by not having an insight into the conditions among farmers and an overview over what the farmers actually needed, as the farmers were not involved at any step in the planning. Some of the effort and planning reflected a lack of coordination among governmental staff and institutions related to the implementation of the BSSP. The extension agents did not receive what they felt was sufficient training, or sufficient resources e.g. for travelling to visit the farmers. In addition, they faced challenges such as farmers' reliance on donations and potential conflicts in farmer groups related to this.

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5.3. Paper 3

Assessing Sustainability of Smallholder Beef Cattle Farming in Indonesia: A case study using the FAO SAFA Framework

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Assessing Sustainability of Smallholder Beef Cattle Farming in Indonesia: A Case Study Using the FAO SAFA Framework

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ABSTRACT

This article aims to assess the sustainability of smallholder beef cattle farms in Indonesia, where there is a national goal to improve the country's beef self-sufficiency, and to explore and discuss potential improvement limitations and solutions. This article presents a sustainability assessment based on the FAO SAFA (Sustainability Assessment of Food and Agriculture Systems) of six selected family farms representing three types of family farming systems (with only family labour; with hired labour; and with hired labour and a 'middleman in marketing system'). Individual structured interviews based on the SAFA guidelines were conducted and the results analysed with the SAFA Tool software. The results showed that the SAFA sustainability performance generally scored better in the farming system with relatively more resources and hired labour, and the household head also working as middleman, as compared to the other two farming systems with some or no hired labour. These results indicate that the larger room for sustainability improvement relies in the farming systems with only family labour. Lack of information, training and economical resources showed to be two main drivers that explain part of these differences. These results suggest that the government's role in increasing awareness, providing information and training and facilitating sustainable development practices is critical.

Keywords: SAFA assessment, Indonesia smallholder beef cattle farming

INTRODUCTION

Indonesia's so-called Beef Self Sufficiency Programme (BSSP) was introduced in 2004 by the Indonesian government through the Ministry of Agriculture with the aim of reducing Indonesia's dependency on cattle and beef imports, and more specifically to achieve 90 per cent self-sufficiency by 2014. An additional objective of the BSSP was to improve the national beef cattle marketing

system, smallholder farm management and the income of the smallholder farmers. The Indonesian cattle population was planned to increase to 14.6 million by 2014 as part of BSSP's outcome (Indonesian Government Regulation No. 19 year 2010). In 2012, 35 per cent of the national beef consumption was still supplied from imports of live animals and frozen meat from Australia and New Zealand (Setianto et. al. 2014). Setianto et al. (2014) showed that the Indonesian beef cattle production had difficulties to reach independency from beef import and could not reach the 2014 goals.

Most of the beef cattle farming in Indonesia are based on smallholder farming systems (Hadi et al., 2002). A previous study involving Indonesian smallholder beef cattle farmers (Gayatri and Vaarst, 2015) showed how the farmers faced many challenges related to improving beef cattle farming practices. Furthermore, it showed that farmers were mostly unaware of the existing government policies on BSSP. The continuity of small family farms is a key point when discussing the sustainability of livestock farming systems (Bernués et al., 2011), including the capacity of a smallholder farming system to contribute to the local economic systems through their contribution to foster employment and increase family income (FAO, 2013a). Moreover, the capacity of smallholder farming systems to adjust to less local challenges, such as in relation to climate change, resource allocation, ecosystems degradation, as well as their tradeoffs, is also fundamental in order to become more sustainable (Bernués et al., 2011; Permani, 2013). This could raise questions about how to reach the long-term goals of becoming self-sufficient in beef production in a sustainable manner.

One of the most used definitions of sustainable development is "the development that meets the needs of the present without compromising the ability of future generations to meet their own

needs" (WCED, 1987). The concept of sustainable development traditionally encompassed environmental, social and economic dimensions, sometimes referred to as the "triple bottom lines of sustainability" (Hacking and Guthrie, 2008). The United Nations Commission on Sustainable Development (CSD) formally introduced governance as the fourth dimension of sustainable development (Spangenberg, 2002).

The development of tools to assess sustainability has become a rapidly developing area (Binder et al., 2010). Sustainability assessment has been viewed as "a tool that can help decision-makers to decide what actions they should take and should not take in an attempt to make society more sustainable" (Devuyst, 2001); or a tool to ensure that plans and activities make an optimal contribution to sustainable development by referring to the four dimensions of sustainability (Binder et al., 2010).

A number of context-generic frameworks have been developed for assessing sustainability of agricultural systems, which can be applicable to a diversity of contexts and, compared with more context-specific frameworks, require a lower amount of resources (Gasso, 2014). It is the case, for example, of the recently developed "Sustainability Assessment of Food and Agriculture Systems" (SAFA) (FAO, 2013a), "The Response-Inducing Sustainability Evaluation" (RISE) (Häni, 2003), and "The Committee on Sustainability Assessment Tool" (COSA) (IISD, 2008). The three frameworks have a global geographic applicability, but differ in terms of sector applicability, sustainability perspective and targeted stakeholders (Gasso et al., 2014; Gasso, 2014). Specifically, SAFA covers a wider range of industries (cropping, livestock husbandry, forestry, fisheries and aquaculture) and a wider range of sustainability dimensions and aspects – especially in relation to

the governance dimension – and it targets a diversity of stakeholders (e.g. supply chain stakeholders, policy makers and non-governmental organizations) (Gasso et al., 2014; Gasso, 2014).

This article aims to assess the sustainability of smallholder beef cattle farms in Indonesia, where there is a national goal to improve the country's beef self-sufficiency, and to explore and discuss potential improvement limitations and solutions. This article presents and discusses the results of a FAO SAFA sustainability assessment carried out at six private smallholder farms.

METHODOLOGY

The Sustainability Assessment Approach

The "Sustainability Assessment of Food and Agriculture Systems" (SAFA) framework (FAO, 2013a) was selected for this study due to its wide sustainability dimensions scope, its applicability to smallholder livestock farms (FAO, 2013a), and its lower design and implementation time and resource requirements, when compared with more context-specific frameworks (Gasso et al., 2014). The assessment was conducted in accordance with the SAFA guidelines v.2 (FAO, 2013b) and the reporting was adapted to the updated guidelines v.3 (FAO, 2013a). The level of assessment used was the farm level.

The SAFA framework is structured according to several hierarchical or aggregation levels (i.e. dimensions, themes and indicators). The most general level comprises sustainability dimensions. At the intermediate level, each dimension comprises a number of themes and subthemes that are the elements associated with specific sustainability goals and objectives. At the most specific level, each subtheme comprises indicators that are measureable and verifiable factors based on a five-scale performance rating (i.e. best performance, intermediate performances with room for

improvement, and unacceptable performance) (FAO, 2013a). The SAFA framework comprises four dimensions (i.e. governance, environmental integrity, economic resilience and social well-being) and twenty-one sustainability themes, which are defined by fifty-eight subthemes with 116 indicators. The SAFA indicators focus on performance rather than management systems, however alternatives indicators, i.e. target-based and practice-based indicators, are proposed by SAFA for contexts where performance-based indicators are not measurable.

Contextualisation and Selection of Indicators

The SAFA contextualisation and indicator selection steps allow specific assessment framework modifications for small-scale producers, because these farmers face certain assessment challenges, including limited existing data and relevance of global indicators (FAO, 2013a). The assessor can (i) omit some specific sustainability themes that are irrelevant for their context and (ii) avoid the use of performance-based indicators that measurements are not accessible, and use instead practice-based indicators (FAO, 2013a). A group of sustainability themes were identified as being irrelevant to the operation of smallholder beef cattle farming systems in Indonesia and therefore excluded (Table 1). Moreover, a group of performance-based indicators where measurements were not accessible was substituted by the practice-based indicators proposed by SAFA (Table 1).

Table 1. List of sustainability sub-themes excluded for being irrelevant within the assessment context and list of sub-themes where performance-based indicators were substituted by the practice-based indicators proposed by SAFA.

Excluded sub-themes due to their irrelevance for the assessment context.	• Mission explicitness; Mission driven; and Due diligence (which form the *Corporate Ethics* theme) - irrelevant for smallholder producers. • Holistic audits; Responsibility; and Transparency (which form the *Accountability* theme) - irrelevant for smallholder producers. • Sustainability management plan; and Full-cost accounting (which form the *Holistic Management* theme) - irrelevant for smallholder producers. • Indigenous Knowledge (which form part of the *Cultural Diversity* theme) - no indigenous groups were present in the assessed districts. • Employment relations; Forced Labor; and Freedom of association and right to bargain (which form part of the *Labor Rights* theme) - excluded only for farming system without hired labour.
Sub-themes where performance-based indicators were substituted by practice based indicators proposed by SAFA.	• Greenhouse gases; and Air quality (which form the *Atmosphere* theme). • Water withdrawals; and Water quality (which form the *Water* theme). • Soil quality; and Land degradation (which form the *Land* theme). • Ecosystem diversity; Species diversity; and Genetic diversity (which form the *Biodiversity* theme). • Materials use; and Energy use; and Waste reduction and disposal (which form the *Materials and Energy* theme). • Animal stress (which form the *Animal welfare* theme)

Data collection and participants

Data were collected in December 2013–January 2014 in Semarang Regency, Central Java Province, Indonesia. Two districts, Bawen (district A) and Ungaran Barat (district B), were selected based on the biggest and the lowest population of beef cattle. Together with the head of the Central Java Province Livestock and Fishery Office, which was approached as a key informant, the first author has chosen two villages, Ungaran village and Polosiri village, based on the biggest population of beef cattle in both districts.

With the help of two informants at each of the two local livestock offices, three different beef cattle farming systems were included in the study:

- Family farming systems with only family labour (system 1);
- Farming systems with hired labour (system 2);
- Farming systems with hired labour and where the husband in the household was also a "middleman" in the local marketing system (system 3).

The first author and key informants were able to identify a number of farms of each type, and selected three of these farms in each district using a stratified random number system. We divided the beef cattle farmers' population into three smaller groups, each representing a type of farming system. Next, we randomly selected one participant from each of these groups. This approach was chosen to cover a range of farming systems and explore how they differ in terms of sustainability performance according to SAFA. At the end of this process, six farms were selected: 1A, 1B, 2A, 2B, 3A, 3B, where the number represents the farming system and the letter the district of the farm. The farm characteristic is presented in Table 2.

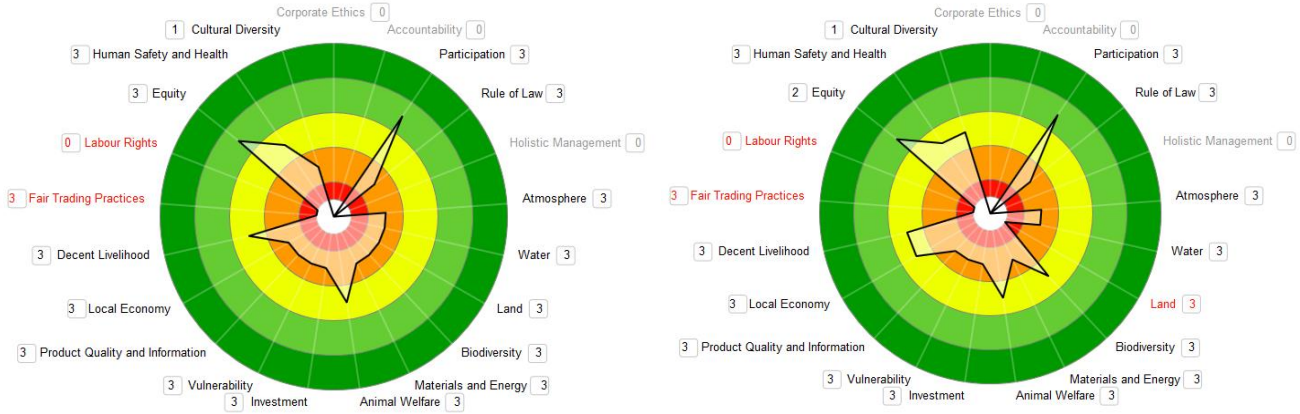
Table 2. The Farm characteristic

Farm no.	Cattle no.	Employees no.	Family No.	Cultivated land (m^2)	How do they produce their feed for the cows
District Bawen (District A)					
1A	2	0	4	6.000	Collected from village surroundings and bought from a neighbouring village, especially during the dry season
2A	9	1	6	10.000	Collected from village surroundings and bought from a neighbouring village, especially during the dry season
3A	45	2	4	80.000	Cultivated from their own land and bought from feed suppliers
District Ungaran (District B)					
1B	3	0	3	6.000	Collected from village surroundings
2B	12	1	5	12.000	Collected from village surroundings and bought from a neighbouring village, especially during the dry season
3B	30	1	5	50.000	Cultivated from their own land and bought from feed suppliers

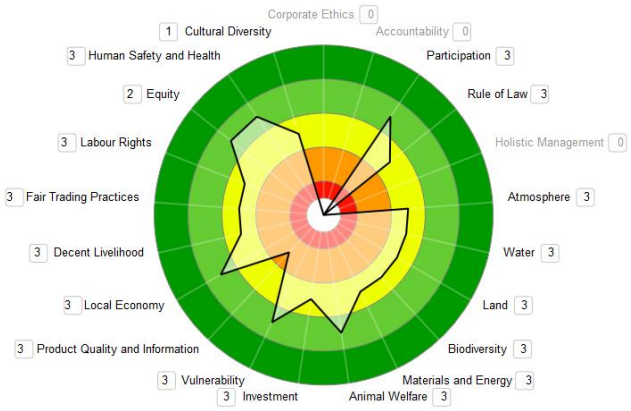
Structured interviews (90–120 minutes of duration) aiming at filling a questionnaire based on the SAFA indicators (FAO, 2013a) were conducted in the six selected farms. There were few open-ended questions, e.g. regarding the choice of practices. The questions were translated into Bahasa Indonesia language by the first author. The results of the six interviews were entered into the *SAFA Tool* software developed by FAO (FAO, 2014).

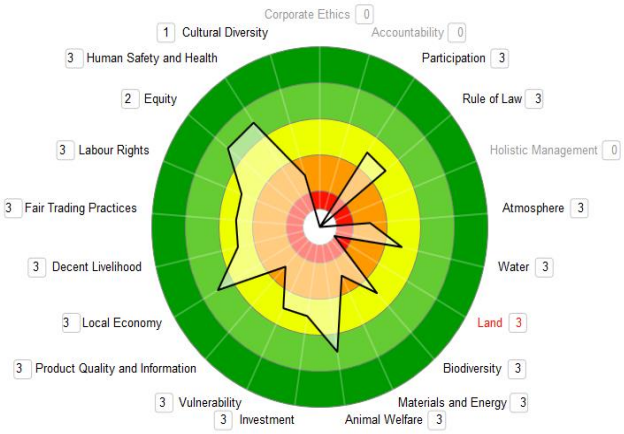
RESULTS

Figures 1 to 3 present the sustainability performance polygons produced by the *SAFA Tool* for each of the six participating farms. The performance polygons fall into a range from green (illustrating "good performance"), to yellow/orange (illustrating "need for improvements"), or red (named "unacceptable performance"). The white colour represents the excluded themes. The numbers near the themes mean the data quality and accuracy score, where 0 represents excluded themes, 1 represents low data quality (data based on estimation), 2 represents moderate quality data (data based on secondary data), 3 represents high quality data (data based on primary current data, not later than two years old). In this study most of the themes presented a high quality data score and all data were based on current data.

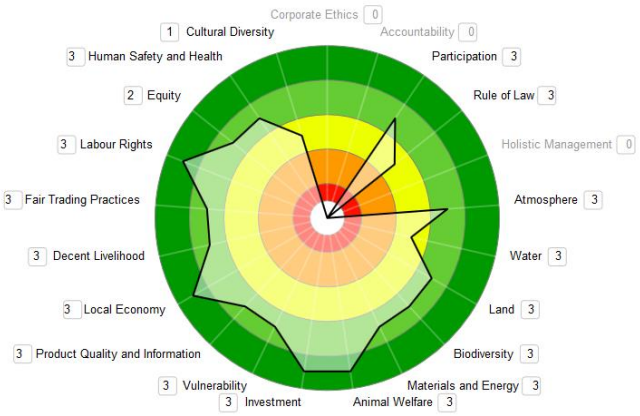


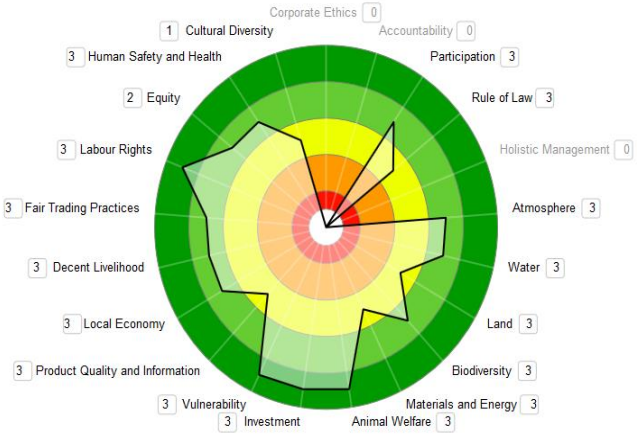
None of the analysed smallholder family farms (system 1) scored dark green in any theme, but scored green for *Equity* and *Participation* (and *Local economy* for 1A). On the other hand, there were red scores in *Fair trading practices*, *Labour rights* and *Land*.





The two farms in the farming system 2 scored generally yellow and green, except *Product quality and information*, and *Materials and energy* that scored orange, and *Land* for the 2B farm that scored red.





The two farms in the farming system 3 scored generally green and dark green, except for *Cultural diversity* and *Rule of law* for both farms; and *Water*, *Land*, *Materials and energy* and *Product quality and information* for some farms that scored yellow. None of the analysed farms in system 3 scored any orange or red.

GOOD GOVERNANCE DIMENSION

Participation

This theme refers to ensuring involvement of the stakeholders and the farmer's ability for conflict resolution in relation to other parties potentially affected by the farm activities. Whilst five farms scored green, farm 2B scored yellow, due to conflicts over manure smell with a neighbour farm. The participants from farming systems 3 explained that they had commitment to engage in dialogue whenever the community and other stakeholders were affected by the farm activities. For example, they entered into dialogue when the farm activities had affected a part of the road in the middle of the village. The farms 3A and 3B donated for road reconstruction. The owner of farm 3B said that trust and communication played an important part in solving conflicts with other stakeholders related to the farming systems, for example feed suppliers.

Rule of law

This theme aims to ensure that the farm is committed to fairness, legitimacy and protection of the Rule of law. Four of the interviewed farmers (systems 2 and 3) scored yellow, while the two farms from farming system 1 scored orange. Farmers in farming system 1 had more limited access to information and networks, hence a lower awareness in relation to regulations than the farmers in farming systems 2 and 3.

ENVIRONMENTAL INTEGRITY DIMENSION

Atmosphere

The Atmosphere theme refers to the integrity and preservation of clean air, including green-house gases (GHG) and air quality. The farms in farming system 3 scored green, while farms in farming systems 1 and 2 scored yellow and orange. The farms in system 3 were implementing activities that

would reduce GHG emissions, such as manure treatment and mixed-crop livestock systems. The farmers in system 3 knew that these practices affected the soil composition and reduced the environment impact of the farming activities through complementarity between crops and livestock production, e.g. using dry rice straw as forage for the cows, so that it optimizes agricultural waste.

Water

This theme is relevant in a sustainability context because water stress, in addition to pollution and degradation of the world's freshwater sources, is one of today's most severe environmental challenges. Farms in farming system 3 scored green, while farms in farming systems 1 and 2 scored yellow and orange. The farms in farming system 3 had better water management practices, such as avoiding the release of polluted wastewater in surrounding water sources and applying rainwater for harvesting. Based on first author' observation, the stables in farming systems 1 and 2 were located less than ten metres away from the water sources, which could cause some risks, e.g. for human health.

Land

This theme covered the practices to improve soil quality and reduce land degradation. Farm 3A scored green; farms 1A, 2A, 3B scored yellow and orange; while farms 1B and 2B scored red. Some farms scored green because they had done an effort for land conservation and soil rehabilitation, for example with the application of organic fertilizers (compost manure), which enhance soil organic matter content. The farms with red score did not use the manure as fertilizer. The farmers in these farms had a lack of information and guidance about composting manure.

Biodiversity

This theme refers to the conservation of all forms of biodiversity and focuses on the allocation of areas to different uses and diverse species to support food security. Farms in farming system 3 scored green, while farms in farming systems 1 and 2 scored yellow and orange. Farms in system 3 had a more diversified crop production and mixed crop-livestock systems, whereas the farms in farming system 1, which got a lower score, had a monoculture crop production system.

Materials and energy

This theme refers to minimizing materials and energy through economical and efficient use. The farms in farming system 3 scored green, whilst farms 1A, 1B, 2A and 2B scored yellow and orange. Farms in system 3 were applying practices that according to the SAFA guideline could replace energy-intensive processes by less intensive alternatives, such as better natural air circulation in the stables, efficient electricity use using halogen light bulbs, use of manure as fertilizers and as biogas feedstock, and crop waste-paddy straw to feed the cows.

Animal welfare

Animal welfare in SAFA has to do with the physical and psychological well-being of the animal. The farms in farming systems 2 and 3 scored dark green, while farms in farming system 1 scored yellow. The farms in farming system 2 and 3 had regular monitoring of animal health, including written records and vaccinations. Their stables had fresh air, sufficient light, and a high score of cleanliness. The owners of these farms attended workshops about animal welfare. On the contrary, in the farms in system 1 no regular vaccination was there, except in periods where they could pay for it.

ECONOMIC RESILIENCE DIMENSION

Investment

The Investment theme relates to the farms' investment into capital goods, human resources or ecosystems, and includes internal investment, community investment, long-term investment and profitability. The farms in farming system 3 scored dark green. These farms had more resources and hence invested their capital in the last five years in renovating the stables and in the owner attending workshops about animal welfare. There were no records of negative socio-economic or environmental impacts as a result of the farms' investments. Moreover, the farms in farming system 3 recorded costs per unit of production as well as the break-even point for the products increasing their capacity to manage the farm's profitability. The farms in farming systems 1 and 2 scored yellow and orange.These farms did not have business and investment records and plans.

Vulnerability

The Vulnerability theme relates to the capacity of households or individuals to prevent, mitigate or cope with risk. The farms in farming system 3 and the farm 2A scored green and dark green, while the other farms (1A, 1B and 2B) scored yellow and orange. The farms in farming system 3 were able to identify and evaluate which risks could potentially threaten their business, such as the lack of pasture and feeds, or animal diseases. Moreover, these farmers implemented actions to reduce potential supply risks, for example making hay for the dry season. The farmers in system 3 also applied practices to increase stability of their production, e.g. managing cattle diseases by increasing animal welfare and having regular vaccinations. Farmers of farms 1A, 1B and 2B faced lack of ability to cope with risk, and developed problems such as the scarcity of forage during the dry season.

Product quality and information

This theme targets factors such as food quality and food safety. The farm 3A in farming system 3 scored green, while the other farms scored orange. Farm 3A kept product quality through maintaining a better feed quality together with a regular vaccination, due to having more financial resources. In all six farms, there were no records or observation that the material input and products might potentially cause health effects.

Local economy

This theme is related to the contribution of the farm's activities to the local economy in terms of local employment and tax and local procurement of resources. The farms in farming systems 2 and 3 scored green or dark green, and a farm in system 1 scored yellow. The farm activities in farming systems 2 and 3, due to their production size, gave more benefits to local economy through the creation of local employment.

THE DIMENSION OF SOCIAL WELL-BEING

D*ecent livelihood*

'Livelihood' comprises the capabilities, assets (material and social resources) and activities required for a means of living that meets the basic needs to maintain a safe, decent standard of living within the community, with the ability to save for future needs and goals. Farms in system 1 and 2 scored yellow, while farms in farming system 3 scored green. In farming system 3, there was an agreement between the farmers and the employees about overtime payment – fully compensated by the owner of the farm – and farming systems 1 and 2 were not scored on this. Moreover, the farms in farming system 3 could provide training for themselves and their employees, so that their farm practices

could improve and become more productive. In contrast farms in farming system 1 and 2 did not have opportunities to join farm management training sessions.

Fair trading practices

The theme on 'Fair trading practices' includes legal rights, which allow farmers to have access to markets where fair prices are negotiated. The farms in farming system 3 scored green, the farms in farming system 2 scored yellow and the farms in farming system 1 scored red. Due to lack of resources, the farms in farming system 1 had a low bargaining position in the marketing system, where the price of live cattle was determined by the physical condition of the cows (with weight measured by a guess from the buyer rather than by scales) and the farmers in farming system 1 had no resources to bring their cows to the district cattle market. In contrast, in the farms in farming system 3, the farmer was the middleman himself, therefore their better bargaining position in the marketing system.

Labour rights

The Labour Rights theme aims at seeking regular employment that is fully compliant with national law and agreements on contractual arrangements, labour and social security. The farms in farming system 3 scored green and the farms in system 2 scored yellow, while the farms in system 1 scored red. The farms in farming system 3 had an agreement that the employee' salary meet the standard salary in their area (Rp 1.000.000 : 1 million rupiah). Whilst in farm 2 the employees were the family relatives, and mainly part time job and the salary lower than standard salary. The husbands in farming systems 1 were leading the farm operation, and the wife also took part in the decision-making. In addition, children helped with the work, and there were no employees. Young children helped on the farm but still had opportunity to attend school.

Equity

Equity involves the degree of fairness and inclusiveness regarding resource distribution, decision making and possibilities for fair working conditions. All six farmers scored green. There was no discrimination between the owner and the employees, each fulfilling their tasks in accordance with the agreements. According to their statements, husbands and wives shared decisions and risks, with a high degree of equity.

Human Health and Safety

This theme is related to the promotion and maintenance of the physical, mental, and social well being of workers. The farms in farming system 2 and 3 scored green, while the farms in farming system 1 scored yellow. Judgement on this theme was based on observation of the farm environment. The farms in farming system 2 and 3 were cleaner and with well-maintained structures, compared to both the farms in farming system 1. In addition, the farms in farming system 2 and 3 had installed shower rooms and had boots available at the farm, which supported health and safety.

Cultural Diversity

The theme of Cultural Diversity relates to the respect for the intellectual property rights of the indigenous community and to the contribution to food sovereignty in the local area. All six farms scored yellow. No group that could be characterized as ‘indigenous’ was present in the assessed districts. The farmers could buy the cows available on the market, but they did not have full control over the semen of the artificial inseminations sponsored by the government.

DISCUSSION

1. The SAFA Sustainability Performance of the analysed farms

The results of the SAFA Sustainability Performance of the analysed farms suggest that some of the patterns related to sustainability are systematically linked to the type of system, and they can be explained by access to information and knowledge, networks and economic resources.

The farms in farming system 3 (and partially in farming system 2) had better environmental management, related to, for example, the use of a more diversified crop production and mixed crop-livestock systems, utilisation of manure as organic fertiliser or crop waste as feed. The farmers from these systems (system 3 and partially system 2) were also aware of the importance of the environment for the sustainability of their farm and the society. Stakeholders such as local government staff and university staff, who were engaged in activities like policy making and farming training, can be an important tool for increasing their environmental knowledge and awareness, and hence increasing their engagement in sustainable practices (Bernués et al., 2011). The cleanliness and hygiene on the farms, the education of the people working on the farm and the contracts with the farm workers may be explained by better information and access caused by the larger networks that the farming system 3 (and partially the farming system 2) involve. Some of the environmental issues and themes were related to the economic resources availability of the farm. For example, water management and manure treatment practices, production of biogas and regular use of animal vaccinations were all connected to the investments that were possible in the farms of farming system 3 and partially farming system 2, while they were an important limitation in the farms of the farming system 1.

In the economic resilience dimension, the farms in farming system 3 (and partially in farming system 2) also scored better. Their higher economic capacity is indicated, for example, by the level of their investments, and their lower vulnerability to risks related to production instability, animal diseases and feed self-sufficiency. However, better economic records and management could be applied independently of the economic capacity and help to increase the farm economic resilience. For example, appropriate learning and the creation of accurate business records will help the farmers to develop a business plan, and allocate resources to generate and increase profits in the long term (FAO, 2013a). Also, farmers can use business records to determine what the efficiencies and the inefficiencies are, measure progress of the business and plan for the future. The better bargaining position of the farming system 3 is probably caused by the existence of the middleman within the farm.

The higher economic resources also influence the social well-being dimension, for example showed in the differences regarding providing certain types of farming equipment to the workers, which was possible in farming system 3 farms.

In the good governance dimension, the difference between systems in the Rule of Law scores can be explained by a better access, of the systems 3 (and partially 2), to information and networks, e.g. in the local cattle markets, which potentially gave them a better understanding of beef cattle policies, regulations, taxes and laws. Therefore, access to information and networks provides management guidance especially for smallholder farmers to make a decision and take ownership of their farming practices and government policies (White, 2014), such as the BSSP. Boström (2012) suggested that the improvement of social sustainability can be done through strengthening the farmers' participation and empowerment process at the farmers' organization in order to improve

collaboration and communication among farmers and workers. This study points to the relevance of encouraging farmers to contribute to the planning and/or to the development of their own farm. It is important for a farmer to have the overview over a governmental policy in order to be creative and innovative in the policy implementation, like the BSSP.

The results of the analysed farms show that the SAFA Sustainability Performance was better for the farming system 3 (hired labour with the farmer as a middleman); it was average for the farming system 2 (hired labour); and it was worst for the farming system 1 (family farming). These results may mislead to the conclusion that ''the bigger the better''. However, this study suggests that it can be more an issue of access to resources. The access to economical resources appears to be lower for the smaller farms (family farms), however, once a certain level of economic resources is reached, the sustainability performance may not have significant increases. This can be observed in the farms of the farming system 3, which were still classified as small-scale systems, but already scored relatively well, despite some specific themes, where some improvement measures could be applied. These results suggest that the larger room for sustainability improvement relies in the family farming systems (system 1), followed by the farming system with hired labour but not marketing activities (system 2).

On an overall level, two main drivers seem to explain some differences in performance between the analysed systems: information/training and economical resources access. Therefore, it is critical to develop practices and processes to improve efficiency, while reducing the environmental and social impacts by increasing awareness, information and training, and facilitating sustainability-related investments by, for instance, finding and supporting suitable and economical solutions, as proposed by Steinfeld et al. (2006).

2. Potentials and limitations of SAFA for analyzing and improving the sustainability of Indonesian smallholders beef cattle faming

SAFA can be used as a training tool used by both farmers (e.g. by voluntary uptake) and the government agricultural institutions, such as the Livestock and Fishery Offices, which aim at assisting smallholder farmers with little resources to improve their production and performance in terms of sustainability. This framework can potentially motivate the farmers to learn and improve their farm management. Furthermore, it can help the farmers to become aware of more global sustainability issues and of other issues in need of future risk management (FAO, 2013a; Gasso et al., 2014**)**. There might be a potential to use it as indicating future relevant focus areas in terms of sustainability for the local government to improve rules and regulations, as well as risk management. Moreover, it may help to create synergies between the practices required to meet their needs and the concerns of a wide range of stakeholders, from farmers to policy-makers.

Conducting the SAFA assessment in this study was complex, it required a long period of time, and not all the themes utilised were relevant. The use of more context-specific assessment frameworks (e.g. Reed et al., 2006; Binder et al., 2010; van Zeijl-Rozema and Martens, 2010) would help focus on the specific context in which the sustainability assessment is embedded, because they are based on themes and indicators that are applicable within exactly the specific context (Gasso et al., 2014). However, these more context-specific frameworks may reduce the possibilities of benchmarking across different systems, and they can be especially more time- and resource-demanding due to the need for the design of the framework components (Gasso et al., 2014). In these regions in Indonesia, sustainability assessments were not systematically conducted on smallholder farms and were not part of a legal requirement. A context-generic assessment framework like SAFA can be a first step to involve farmers, decision-makers and policy makers in deciding which issues can be

relevant in their context and which actions can be taken or not, in order to make agriculture practices more sustainable (Gasso, 2014; Pope et al., 2004).

3. Moving towards a more sustainable and self-sufficient sector

The Indonesian beef cattle farmers faced many challenges in their daily lives as well as scarcity of resources in terms of land, capital and feed resources (Permani, 2013). Previous studies showed that the smallholder farmers in these particular districts also faced these challenges (Gayatri and Vaarst (2015). Setianto et al., (2014) also found there has been continuous import of beef cattle after the BSSP had been running for ten years. This obviously means that the Indonesian beef sector had difficulties in meeting the Self-Sufficiency goal. Part of the challenges of meeting this goal had to do with the beef cattle production under challenged farming conditions, as explained above, and where the farmers (especially in farming systems 1 and 2 in this study) had not been fully aware that the government had initiated a programme which had these aims. This suggests that effective and respectful communication should be prioritised to create harmony between national goals and the capacity and priorities on farming systems and farming sector levels (Othman & Muhammad (2011). Pope and co-authors (2004) emphasised that good communication with the farmers will help improve plans and activities to make an optimal contribution to sustainable agriculture.

This study aimed at investigating aspects of sustainability on the farms that were expected to contribute to fulfilling this national goal. This leads to the question that we wanted to raise in this study: how to become beef self-sufficient in a sustainable manner, taking the starting point in the smallholder farms. We view ''sustainable practices'' as practices that allow the future generations to be able to sustain their livelihoods in dignity. Current farmers' transformation to such practices may need governmental support, in terms of knowledge generation and resources to implement

practices – such as better integrated crop-livestock farming, composting manure for crop fertilizer, being self-sufficient in feed, or implementing local, regional or national marketing systems. The result of the SAFA assessment showed that farmers with better resources scored higher. Based on these findings, we suggest that more research is needed to explore these findings and the potentials to improve the sector, since most of the beef cattle farmers in Indonesia are smallholder farmer families with little resources and lack of education in cattle farming, as well as little insight into aspects of sustainability. FAO states that smallholder farmers need a sustainability-oriented governance structure that includes the process of decision-making in order to take ownership of their farm, and ensure equitable access to vital resources and equity to the law and regulations (FAO, 2013a). Graeun et al., (2015) suggested that governments should harmonize long-term policies to improve the contribution of family farming to food security in a sustainable manner.

Sustainable agriculture combines the governance, social, economic and environmental dimensions (Valentin and Spangenberg, 2000). A focus on only one dimension at the expense of others may be risky (Yunlong and Smit, 1994). For example, agricultural production systems cannot be regarded as sustainable if they neither can produce an adequate food supply nor provide sufficient economic rewards to farmers, even if they maintain environmental quality. Similarly, agricultural systems that maintain relatively high levels of production, but employ increasing amounts of inputs to offset the yield or having impacts of environmental degradation, would be viewed as less than sustainable (Yunlong and Smit, 1994). Beyond that, sustainable agriculture might set an example that would help to open new doors to a more socially equitable society (Schaller, 1993).

This article presents and discusses the results of a sustainability assessment carried out at six private smallholder farms in Indonesia using the SAFA assessment developed by FAO. The authors

realised that it is needed to assess more respondents and to cover a larger geographical area in Indonesia in order to get more overview and a new perspective of Indonesian beef cattle farmers regarding sustainable practices. Further research is important to validate the findings of the study, such as individual interviews to get an insight of the perception of Indonesian beef cattle farmers about the sustainability concept. Moreover, more research is also needed on how to increase the farmers' participation and implementation of improved sustainable practices in order to support the Indonesian government to achieve a long-term sustainable beef production.

CONCLUSION

The result of the study provides information on how different farming system would influence the performance in sustainability. These results suggest that the larger room for sustainability improvement relies in the family farming systems (system 1), followed by the farming system with hired labour but not marketing activities (system 2). The main drivers that explain a lower sustainability performance between the analysed systems seem to be related with limitations in access to information and knowledge, networks and economic resources. The assessment results can be a motivation for internal improvements, but also an important tool to give recommendation for the local government, in which themes of sustainability need to be improved in the future. SAFA framework can be beneficial to government institutions and existing sector sustainability concerns and concerns about the farmer's needs, especially smallholder farmers with little resources to improve their sustainability performance. We argue that it is therefore important for the government to focus on sustainable development within their policies as well as on identifying alternative approaches for empowering the farmers and the industry to create a sustainable technological and social advancement.

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5.4. Paper 4

Indonesian Smallholder Beef Producers' Perception of Sustainability and Their Reactions to the Results of an Assessment Using the Sustainability Assessment of Food and Agriculture System developed by the UN FAO – A Case study Based on Focus Group Discussions

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ABSTRACT

Two groups of farmers were interviewed about what "sustainability" means to them with regard to their daily practices, both in their daily working life and after being confronted with the results of an assessment conducted on their farms prior to a focus group discussion (FGD) utilizing the Sustainability Assessment of Food and Agriculture (SAFA) system developed by the Food and Agriculture Organization (FAO) of the United Nations (FAO). The study presented in this article is based on two FGDs, using the results of the SAFA online assessment as a tool to initiate and facilitate the discussions. The two group discussions were recorded using a digital voice recorder, transcribed in full and then coded using the software program Transana. The discussions were organized into themes, which allowed a basis for the further analysis. The themes allowed us to build a picture of the participants' views and thoughts on sustainability with regard to their farming management practices in the light of the SAFA framework, and their own thoughts and perception of the government's action to promote sustainability, as well as to consider its implications for the futures of their own farms. The interviewed farmers thought of sustainability on a day-to-day context rather than as a multi-dimensional concept. In their views, sustainability was very much about being able to continue farming, for the farm to survive and about being able to hand it over to the next generation. However, when presented with the four dimensions of the SAFA framework, they acknowledged the wider perspectives and different aspects of sustainability and reflected about how their own agricultural practices related to these wider aspects too.

Keywords: Indonesian smallholder beef cattle farmers, Sustainability, SAFA assessment.

1.0. INTRODUCTION

The concept of sustainability has been interpreted, presented and understood in many different ways in relation to agriculture (Pretty, 2008). Pugliese (2001), for example, describes "sustainable agriculture" as a form of agriculture that includes a dynamic set of practices and technologies that enhance the environment while providing income to the farmer over a long period of time, in combination with agricultural and social practices that will lead to long-term economic benefits and that are socially attainable in local rural communities (Pugliese, 2001).

One of the most commonly used definitions of sustainable development was first presented in 1987 in the report *Our Common Future* (United Nations World Commission on Environment and Development (WCED), 1987, p.43) as 'development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs'. Francis and Youngberg (1990) specifically addressed agricultural sustainability in their definition: 'sustainable agriculture is agriculture that is ecologically sound, economically viable, socially just and humane' (p.2). Häni, Braga, Stämpfli, Keller, Fisher, & Porsche (2003) argued for including the non-human

environment and "human dignity" in their development of the Response-Inducing Sustainability Evaluation (RISE) tool for carrying out a holistic sustainability assessment at the farm level, as follows: 'Sustainable development allows a life in dignity for the present without compromising a life in dignity for future generations or to threaten the natural environment and endangering the global ecosystem' (Häni et al., 2003). This was further modified by the Sustainable Agriculture Initiative (SAI) in 2003, which stated: 'Sustainable agriculture adapts productive, competitive and efficient practices, while protecting and improving the environment and the global ecosystem, as well as the socio-economic conditions of local communities in line with human dignity' (Häni et al., 2003).

Different frameworks for sustainability assessment, policies and actions have been organized and implemented, e.g. RISE (Häni et al., 2003), *Indicateurs de Durabilite des Exploitations Agricoles* or Farm Sustainability Indicators or IDEA method (Zahm, Viaux, Vilain, Girardin, & Mouchet, 2008) and "Rapid Assessment" (Leach, Gerrard, & Padel, 2012). Each initiative has an underlying perception of how the concept should be framed and understood. These underlying perceptions may or may not be explicitly explained or brought into the debate. The Food and Agriculture Organization of the United Nations (FAO) developed a system for the sustainability assessment of agricultural and food systems termed the Sustainability Assessment of Food and Agriculture (SAFA) system, in which four dimensions of sustainable development are taken into account and measured using multiple indicators, namely environmental, economic, social, and governance dimensions (FAO, 2013b, p. 2).

The SAFA tool is designed to assess sustainability at the level of farms and companies involved in the food and agriculture sector (FAO, 2013a). It is based on the FAO's definition of sustainability.

> The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable (FAO, 2012, p.3).

The Indonesian government developed and promoted an Indonesian national strategy for sustainable development in 1997, which it initiated in order to accelerate sustainable development in order to combat poverty, enhance environmental protection and rehabilitation, support sustainable resource management and promote the participation of different segments of society in the decision-making process (Ministry of Environment, Republic of Indonesia, 1997, p. 7). The strategy document provided an overview of the key environmental and development issues important for Indonesia, including human services, waste management and natural and land resource management.

The present study is based on a case study analysis of six Indonesian smallholder beef-cattle farms using the SAFA framework. After the assessment was completed, the results were presented to the farmers in specially set up focus groups, which allowed them to explore the results and discuss their views on, and perception of, the concept of sustainability, and how they saw their own practices – both in relation to their own perceptions and in relation to the way in which sustainability was presented to them.

Many studies in the literature have focused on measuring farmers' perceptions of sustainability through analyzing quantitative data, such as Agahi, Ghambarali, & Afsharzade (2011), whose study involved 140 wheat farmers in Iran and utilized structured interviews. They found that there were direct relationships between a numbers of socio-economic factors that were predefined by the authors, such as education, the use of information sources and extension services, and the perception towards sustainable agricultural practices. In the present study, we chose to study the farmers' own perceptions of sustainability and how they relate this to their own working practices by using focus group discussions (FGDs), as we felt that it was necessary to hear their own words on both their perceptions and working practices when they were presented with the concept of sustainability defined in the SAFA framework, which may not be a definition they had heard or consider before.

2.0. METHODOLOGY

2.1. Study sites and the choice of research approach

The study presented in this article was based on two FGDs that took place between December 2013 and January 2014 in Bawen and Ungaran Barat districts, respectively, in Semarang Regency, Central Java Province, Indonesia. Prior to conducting the FGDs, the interviewer conducted an SAFA assessment of each of the farms of the farmers involved in the FGDs. In this way, six different farms were assessed in total, involving three farms of different types (described below) from the two districts, and these provided the background for the two FGDs. The results of the SAFA assessments were presented to the respective farmers during the FGDs so they could discuss them in the group. With this approach, the researchers aimed to ensure both homogeneity and heterogeneity in the group in order to ensure some degree of commonality among the participants but with sufficient variation to allow for contrasting opinions to be included as well as a range of experiences (Halkier, 2010). This also allowed potentially opening up a common exploration of how different ways of farming potentially related to the concept of sustainability used by SAFA. The three different farm types represented in the assessment in each district were: 1) family farming systems utilizing family labour only, 2) family farming systems utilizing family labour and hired labour and 3) farming systems where the household head was a farmer and also engaged as a middleman in the marketing of beef cattle. In addition to this, one of the farm labourers of the three farm types, and a neighbouring farmer participated in the FGD groups, in order to add other perspectives from different angles. The characteristic of the participants in the FGD groups is presented in Table 1.

The SAFA results were presented as spiderweb vizualizations, showing the performances of a range of different indicators. The visual presentation marked "good performance" as green and "limited performance" as red, to make it quite easy to read and gain a quick overview, and as it was foreseen that this colour coding could help to stimulate an immediate discussion on how and why different practices were seen as sustainable.

The use of focus group discussions is well established as a legitimate data collection method within a qualitative research tradition (Barbour, 2007). The rationale behind the use of focus groups in this study was the advantage they offered to bring together a diverse group of farmers from different farm types and with different experiences, which facilitates and encourages a greater variety of communication and the participants opening up compared to other qualitative methods of data collection, such as individual interviews (Holkier, 2009). It was felt that the group discussions would allow the participants to explore together the concept of sustainability as defined by FAO,

and hence to help bring it from a rather abstract level to a level where they could see it in the context of their own daily practices. As a research tool, we considered that the FGDs could provide insights into the range of opinions, experiences, practices and ideas among the participants, who came from different types of smallholder beef-cattle farms.

2.2. Selection and recruitment of participants

The head of the Central Java Province Livestock and Fishery Office was approached as a key informant and was briefed about the interview plans, including our wish to include one farm from each of the three farm types. He was able to identify a number of farms of each type, and from these, three farms were selected using a stratified random number system; whereby we divided the population of beef cattle farming system into four smaller groups, called "strata", comprising family farming systems using family labour only, family farming systems using family labour and hired labour, farming systems where the household head was a farmer and also engaged as a middleman in the marketing system and neighbouring farmers. Next, we randomly selected one participant from each strata.

Table 1. Participants in the two FGDs.

Participants	Age	Education	Role	Gender
Group 1				
Participant 1	54	No formal education	Farmer husband 1	Male
Participant 2	38	Secondary school	Farmer husband 2	Male
Participant 3	41	High school	Farmer husband 3	Male
Participant 4	45	No formal education	Wife of Farmer 1	Female
Participant 5	35	Elementary school	Wife of Farmer 2	Female
Participant 6	40	Elementary school	Wife of Farmer 3	Female
Participant 7	55	Elementary school	Employee to farmer 3	Male
Participant 8	35	Elementary school	Neighboring farmer 1	Male
Group 2				
Participant 9	35	Elementary school	Farmer husband 4	Male
Participant 10	40	Elementary school	Farmer husband 5	Male
Participant 11	40	High school	Farmer husband 6	Male
Participant 12	37	Elementary school	Wife of Farmer 4	Female
Participant 13	35	Elementary school	Wife of Farmer 5	Female
Participant 14	38	High school	Wife of Farmer 6	Female
Participant 15	30	Elementary school	Employee to farmer 6	Male
Participant 16	25	High school	Neighboring farmer 5	Male

Note**,** The farmer couples 1 and 4 and farmer couples 9 and 12 belonged to the category of 'Family farming systems with family labour only', while farmer couples 2 and 5 and farmer couples 10 and 13 belonged to the category of 'Family farming systems with family labour and hired labour', and farmer couples 3 and 6 and farmer couples 11 and 14 belonged to the category of 'Farming systems where the household head was a farmer and engaged as a middle man in the marketing system'.

2.3. The focus group discussions sessions

The focus group discussions were guided by a moderator (the interviewer and first author), who introduced the topics for discussion and helped the group participants to engage in the discussion among themselves, using the following agenda:

1) Session 1 – at the start of the FGDs, the moderator gave a brief introduction to "the sustainability concept" according to the SAFA framework, and its four dimensions-environmental, economic, social, and governance and how it relates to agriculture. This gave the background for the group to discuss their own farm practices and how they could relate to the four dimensions of the SAFA framework.

2) Session 2 – in the second part of the discussion, the results of the SAFA assessments of the host farms were presented to the group. This was followed by a discussion in the group about whether their own performance was regarded as "good" or "limited" (based on the colour scheme mentioned before) according to the SAFA framework, and what their own views on this were.

3) Session 3 – the third part of the FGDs focused on their perceptions of sustainability as a more general reflection, bearing in mind that by now their perceptions will have been influenced by the discussions in the two previous parts of the FGDs. The opening question for this part of the discussion was: 'What is your immediate thought when I say "sustainability", and what do you think of it in terms of your own agriculture and farm management?'.

4) Session 4 – the final part of the FDGs involved closing the session by getting the participants to talk about their views on the future, specifically their future plans for their farms, including how they planned to improve their farm management in the future.

2.4. Data analysis

The two FGDs were recorded using a digital voice recorder, and the recordings were transcribed in full and coded using the software program Transana. This allowed us to group the statements into themes, in order to identify patterns within the data and within the many discussions in the groups, and hence to improve the overview of the data, while still describing the data in detail (Braun and Clarke, 2006), with the purpose of analyzing it. Braun and Clarke state that a thematic analysis is exciting because the researcher can discover themes and concepts embedded in the discussion as it proceeds between the participants. A thematic analysis is different from other types of analysis of qualitative data, such as individual semi-structured qualitative interviews, where e.g. a grounded theory analysis is carried out to seek patterns in the data in order to generate and develop a new theory. We argue that the themes or patterns within data can be identified through this type of thematic analysis, which can also make it possible to discuss the results beyond a particular context. Furthermore, Onwuegbuzie, Dickinson, Leech, & Zoran (2009) explained that thematic analysis seeks the contexts within words, which is especially important in focus groups because it helps to identify themes. The results of the FGDs were thus organized according to the themes that emerged under the headlines for the four different FGDs' sessions. Next, the themes were organized into "thematic headlines". We divided the result into two tables. Table 2 shows the result of FGDs based on FGDs session 1. The themes were organized into thematic headlines, which were partly organized in accordance with the FGDs session 1. Table 3 shows the participants' perception as the result of FGDs session 2, 3, and 4. The thematic headlines were mainly on the basis of the themes identified during FGDs sessions 2, 3 and 4.

3.0. RESULTS

The results of the analysis are shown in Table 2 and Table 3. The themes present a picture of the participants' thoughts about sustainability in their farm management and working practices as reaction to the FAO/SAFA definition of sustainability, and their own thoughts and perception of the

government's action to promote sustainability, as well as the future perspectives for their own farms.

Table 2. The results of the FGD session 1. In the right-hand column, the themes emerging under each point are presented. These were organized into thematic headlines, which were partly organized in accordance with the FGD session 1.

HEADLINES OF FGDs' SESSIONS	THEMATIC HEADLINES	THEMES EMERGING FROM THE DISCUSSION
Applied agricultural practices that the farmers thought of when they heard about the four dimentions of the FAO SAFA definition of sustainability (FGD session 1)	Environment dimension	- Farmers realized that some of their current practices related to environmental issues - Composting manure is a current practice - The use of waste water for crop irrigation is done - Some farmers had reduced the amount of water used for cleaning the stables - Some farmers had built biogas plants at home
	Economic dimension	- Farmers renovated the stables for future use - Farmers realized that minimizing risks can increase production stability, such as making hay and storing feed for the dry season
	Social dimension	- Beef production has benefitted the local economy, e.g. through the provision of meat for local consumption and by providing jobs for people near the farm - There were normally clear agreements between employees and the farmer - Equal decision-making was agreed between the husband and wife
	Governance dimension	- Farmers would like to have continued support from government to promote practices that can make their farms more sustainable

3.1. Farmers' applied agricultural practices in relation to the SAFA definition of sustainability

The participants explored together each of the four dimensions of the SAFA framework by linking them to what they did at home and on their farm. During the discussions, they expressed surprise that several of their own daily agricultural practices appeared to already relate to sustainability, as seen from a broader perspective, either by enhancing or challenge the overall sustainability of their farming system, and also that there were plenty of possibilities to improve their working practices.

First, the groups discussed the environment dimension of sustainability and together identified a number of common agricultural practices that influenced and potentially contributed to improving the environment, such as composting manure (which most of them did), using the benefits of mixed crop–livestock systems, using waste water for crop irrigation (which only some of them did) and reducing water use for cleaning the stables. In addition, with the funding provided by local government, some of them had also built mini biogas plants for home use. As illustrated in the following transcribed piece of dialogue, they began to realize the potential influence that their current working practices had on the surrounding environment:

Participant 8: Water, land - is it related with the environment?
Participant 1: Hey, there is a reason why we need to have this discussion. What is the relation between water, land and the environment?
Participant3: If we do many good things for water, land, do you think it will improve the environment?
Participant 1: Exactly, that is what I am thinking. But how?
Participant 2: We did a lot of things, such as using manure for compost instead of using pesticide.
Participant 1: In my farm, I told my wife to save the water by minimizing water for cleaning the stables. It can save the environment.

At the end of this discussion, the farmers agreed that they actually already did a number of things that could lead to improving the environment, and on the other hand, that there were other things that they needed to be aware of this.

It was seen that the farmers also implemented practices related to the economic dimension of sustainability, such as renovating their stables to access long-term benefits, and by planting grass or corn as well as by making hay to feed the animals from their own resources to reduce the need to buy feed. Ensuring the stability of their farms was particularly mentioned several times during the discussions. The farmers identified several potential risks that could threaten the sustainability of their business, such as the lack of available pastures and feed and animal diseases. In response to these risks, the farmers tried to plan for stable feeding, to avoid input supply during the dry season, and to make hay and store feed. They were aware of the importance of keeping the cows in a healthy condition, and tried to identify any early symptoms of disease, as well as maintaining a good hygiene level and stability in animal management. Furthermore, the farmers emphasized the long-term aspects of maintaining economic stability as being important for the sustainability of their farm and the farming sector:

Participant 10: In the end we just want to get more profit. Not only for this period but also for long time period. Keeping the cows in a heathy condition would reduce the risk so the cows would not get diseased.
Participant 14: In my farm, we provided our cows with pasture or grass that we found in our own land. (…), we were renovating the stables. It can last long and it can save money also in the future.

The farms benefitted the local economy through providing employment, paying local taxes and supplying beef cattle locally. This aspect of farming is related to the social dimension of sustainability in the FAO SAFA framework, which deals with maintaining social relations and contributions to the community. This can, for example, occur through the employment of local people when renovating and constructing housing facilities for the animals. Fair contracts between farmers and their employees, e.g. the inclusion of overtime payments where appropriate, were also mentioned. The shared ownership of farms and shared decision-making by husbands and wives were also mentioned as crucial for long-term social coherence and for maintaining a stable framework for the farm. Although the husband was normally regarded as "the household head" and leader for the daily work, normally his wife and the other family members were involved in the work and shared the decisions and responsibilities, e.g. what to invest in and what to prioritize.

Indeed, the FGD participants agreed that normally there was no discrimination between the husband and his wife who helped to run the farm practices:

> Participant 3: (…). all the benefits were not only for us, e.g. improve family income but also for other people. We also paid taxes.
> Participants 7: Yes, and I get salary based on UMR (Upah Minimum Regional, in English: local standard salary. Ed.)
> Participant 1: Even though we only own a small operation, we help the government to provide local meat for the people, not only meat imported from Australia.

In addition to the governance dimension of the FAO SAFA framework, the participants mentioned the role of the local government in improving beef-cattle farming. They hoped that the government would continue to provide support to the farmers to help them improve their farm management, such as by subsidizing feed.

3.2. Farmers' reaction to the FAO SAFA results for the host farm

The focus groups were introduced to the sustainability concept based on the SAFA framework. The FGD participants had never before been introduced to sustainability as a multi-dimensional concept before. Two sub-themes emerged as a reaction to the results from the SAFA assessment carried out on the host farm. First, the whole discovery of the different dimensions to sustainability under this framework and then trying to relate this sustainability concept to their own daily life and working practices led to a lot of discussion, with a lot of this covering new ground as they had not considered this concept of sustainability before in relation to their own farm practices. The also realized that they actually applied already many agricultural practices that already contribute to sustainability and that could be helpful when planning future farm management, and this made it more relevant for them to be aware of the existence of a sustainability framework, with all its aspects and tools, that could to guide the development of appropriate work practices. The participants agreed that the sustainability concept and its different aspects could be used as guidelines to support continuous improvement and capacity building in order to sustain farming practices and to shape future fair practices in an agricultural context, with the long-term objective of making farming more sustainable, not only just by "surviving" but actually by contributing to an improved environment for future generations. As part of this, they also acknowledged that linking the different aspects of sustainability with their own current practices and taking advantage of the future possibilities to develop additional and improved practices, together with evaluating the strengths and weaknesses of their farms, could help them to obtain a clearer understanding and idea about their future directions.

Second, they gradually discovered how the government actually did something to promote a better and more stable production, as well as higher farm productivity. However, the farmers also had negative experiences and perceptions of the government's role in beef-cattle farming and expressed the view that the marketing infrastructure could be greatly improved, maybe through government regulation of some kind. The participants felt that the government did not fully commit itself to ensuring sufficient future farm land remained available, namely as the participants felt the government had accepted the large-scale conversion of agricultural land into uses for non-agriculture activities, such as housing. The participants felt more land would be required for feed, if beef production were to increase; however, the opposite had happened over the last few years with less land available, with the reasons being, among others, because of increased population density and due to land divisions between siblings, as inheritance. The consequence of this was to make it

increasingly difficult to sustain their livelihoods on the land available. The FGD participants agreed that it is important for the future of beef-cattle farming that the government should intervene with new regulations to at least protect agricultural land, perhaps as part of a beef self-sufficiency programme for the country.

Table 3. The perception of the participants based on the result of FGDs session 2, 3, and 4. The thematic headlines were organized and mainly on the basis of the themes identified during FGDs session 2, 3, and 4.

HEADLINES OF FGDs' SESSIONS	THEMATIC HEADLINES	THEMES EMERGING FROM THE DISCUSSION
Farmers' reaction upon seeing the result of the FAO SAFA on the host farms (FGD session 2)	Realizing a broader concept of sustainability	- The concept of sustainability has some elements or dimensions that have never discussed among farmers before - Farmers agreed that it would be useful to be made aware of how to ensure the sustainability of their own farms and of farming in general - SAFA and this kind of discussion can give some guidance on how farmers could perform better in the future – they just need to know how to use this guidance in practice
	Realizing 'the government actually did something'	- The government supports some farming practices that could improve sustainability aspects, through subsidies, grants, donation and by disseminating information - There are no existing regulations to prohibit the conversion of agricultural land into non-agriculture activity, e.g. to prevent increased urbanization – this is a major threat to farmers and farming
Farmers' perception of what is sustainable (FGD session 3)	What mattered to the farmers to make them feel that beef-cattle farming was sustainable	- A continuous improvement of farming management - Low cow mortality - Cows in good condition - Availability of feed resources - Being able to reduce the smell from manure on and around the farm
Motivation to continuing farming (FGD session 4)	Cows versus cash	- 'The cows are my bank': The cows can easily be converted to cash
	Strategies to continue farming	- Saving to invest in new cows - Borrowing money from neighbours to buy feed
	How does the youth see farming?	- City life is easier - Being farmers is not an interesting future - Farmers' concern on the farm will survive whether they will able to hand over the farm to the children or how their children will make it

3.3. Farmers' perception of sustainability for them in their daily lives

The FGD went on to discuss the perception of sustainability in general: what mattered to the farmers to make them feel that farming could be carried out sustainably in their daily lives? The participants all agreed that the future of beef-cattle farming is dependent on a continuous improvement of farming management. For beef-cattle farming to survive in the future, the farmers need to improve their farming management. However, the farmers also talked of sustainability much more on a day-to-day basis. They defined it among others as 'surviving' and 'being happy', and mentioned the importance of there being no cow mortality or dangerous diseases:

> Participant 10: As smallholder farmer, we just know how to survive.
> Participant 15: If there is no cows mortality and no dangerous diseases, that would make us happy.

Sustainability as a word or concept was not really directly mentioned by the farmers, who rather talked about how the farm could 'remain working' and articulated this as 'surviving', e.g. in relation to the availability of feed resources during the dry seasons. A social life and good relations with the neighbours were also seen as important factors to survival, and in this case, examples where the neighbours complained about the smell of manure were brought forward, both because the social coherence in the neighbourhood mattered and because the farmers realized that the smell was a direct indicator of pollution, which could affect the environment. Often, the farmers were not aware of this and that it was their own responsibility to solve it:

> Participant 8: As neighbour, many times I was complaining about the smell of manure.
> Participant 1: I used the manure as compost.
> Participant 8: I know, but the smell of manure was annoying. I hope you can solve this problem otherwise you will disturb your neighbours.

3.4. Farmers' motivation to continue farming in the future

Cows were described as 'savings', because they could relatively easily be converted into cash when the farmer families needed money, such as to send the children to school or to support a wedding ceremony of their children. Still productivity was a big challenge and took up most of the discussion between the FGD participants. To survive and thus to continue farming without going bankrupt was the main articulation around the subject of the 'sustainability of their own farm and farming', and their strategies were organized around this, including in terms of savings, getting over debts and borrowing money from neighbours, e.g. to buy feed or to pay for artificial insemination of their animals:

> Participant 9: We have many problems, however, I just want to continue my farm. I still want to keep this business in the future. Whenever we need the cash, we can sell our cows. We are just people living in the village. We help each other. If I do not have grass to feed my cows, I can borrow from my neighbour. Last time also, to buy new cows, I had to borrow money from my parents.

3.4.1. The future of farming: youth not attracted to farming

The participants discussed how the youth viewed beef-cattle farming, and agreed that there was a general lack of interest in farming among the younger generation:

Participant 4: The large majority of the youth are still thinking about earning money and living in a big city.

Participant 12: We must inspire them by involving them in daily farming practices but not to force them. That's what we did in our family. I hope my boy will have an interest in agriculture and decide to go to agriculture school.

Participant 14: I can understand! Who could blame them [the youth]? City life is easier.

The participants said that, generally, the youth – even their own children – thought that it was better for them to get a job outside farming. They thought that it was because the youth felt that being a farmer is not an interesting future, despite their parents' efforts to build up a farm that could be handed over. However, they believed that if the younger generation would learn from their parents, they might decide to stay in farming, especially if the parents could show them that beef-cattle farming could be profitable. The participants raised strong concerns that the whole smallholder beef-cattle sector was at risk of disappearing, and that if this were to occur, it would impact the nation in general in terms of its food supply in the future.

4.0. DISCUSSION

In a previous interview study involving Indonesian smallholder beef producers (Gayatri and Vaarst, 2015), the life situation of the farmers were analyzed, showing how they faced many challenges that limited their possibilities for taking new initiatives and developing new or improved farming practices, in order to, for example, increase beef productivity. It also highlighted the fact that farmers were mostly unaware of the existing government policies on beef-cattle farming. Likewise, this study points to the fact that concepts like sustainability have not been raised explicitly with farmers and do not feature in discussions among farmers in the farm environments, neither as a wider concept nor as guidance for future choices, policies or options for development. In this study, we wanted to kick-start this dialogue and chose to do it as a case study to open up a discussion on how to potentially go forward.

4.1. How do the farmers understand the concept of sustainability?

The results of the focus group discussions showed that the farmers had not heard of the wider concept of sustainability. Nevertheless, after it was introduced and then by discussing it, they could see the relevance of it, and could even link some of their current practices to it. The farmers thought about sustainability in a much more day-to-day context, where sustainability was about the continuance of farming, in order to survive to be able to hand the farm over to the next generation. The farmers' discussions reflected the gap between the multi-dimensional view developed by many teams of scientists and actors from development organizations and institutions, including larger organizations and institutions like e.g. the FAO, and the view of a group of farmers working at the farm level, and who are mostly focused on making things work on a daily basis and, to some extent, safeguarding the farm for the next generation. They had in other words a much more down-to-earth based idea of sustainable farming, and one which involved a time horizon that could be overviewed by the current generation. In light of the many efforts done by the before-mentioned teams of actors to formulate goals and create practical frameworks to assess sustainability in practice in a farm context worldwide, this questions the wider practical implications and implementations of their efforts if the concept of sustainability has not diffused into farm environments as something meaningful on an everyday basis. Bruges and Smith (2007) mentioned that collaboration and participation among government institutions and communities are necessary and meaningful in the process of moving towards more sustainable forms of agricultural production. However, the first important step is to have a common understanding of the goals. This brings up the question of how

to involve all the actors on the ground – in this case, the smallholder beef producers – in setting and bringing larger sustainability goals into practice? This could point to a need to increase and improve the way in which the concept of sustainability is introduced and linked to practical action from the government level to farmers and the farming community. According to Pannell and Schilizzi (1999), there is a need to build a system and this is essential to introduce and improve the understanding of sustainability. This system is envisioned in its broadest sense to cover the individual farm, to the local ecosystem, and to communities affected by this farming system both locally and globally, in order to explore the interconnections between farming and other aspects of the environment, including the social and economic dimension (Pannell and Schilizzi, 1999). Pannell and Schilizzi suggested that it has to be addressed by focusing on particular aspects of sustainability that the decision-maker considers important, and presenting information about the trade-offs between the different aspects of sustainability (environment, social, economic, and governance) within a multiple criteria decision-making formula.

Making the transition to sustainable agriculture is a long process for farmers (Dillon, *Hennessy, & Hynes*, 2009). Dillon et al. (2009) referred to a study in which they assessed the sustainability of Irish agriculture, and demonstrated that the transition to sustainable agriculture requires a series of realistic processes. Farmer families' economic condition and personal goals influence how fast or how far farmers can go in the transition. It is also important to realize that each small decision can make a difference and can contribute to advancing the entire farming system towards it becoming a more sustainable form of agriculture, for example, applying new agriculture practices to improve a farmer's income.

Mollenhorst and de Boer (2004) mentioned that there are many ways to improve the sustainability of a farming system through applying some common practices and daily management. In their study, they included water consumption for production, composting manure, improved feeding practices, participation in farmers' groups, and utilizing extension programmes. All these practices contribute to long-term farm profitability, better environmental stewardship, and the rural quality of life.

4.2. The relevance of using the FAO SAFA tool as interview tool in an Indonesian context

In the two focus group discussions, the SAFA framework developed by the FAO was used as a tool for the data collection and to encourage participants to discuss and explore the concepts together as a group, rather than the alternative of them being interviewed by the group moderator. Based on the moderator's observations, the tool helped the participants to focus on the topics related to the different aspects of sustainability, which were introduced into the discussion by the first author of this report, which the farmers responded to and reflected about, which threw up some interesting results as this was the first time they had ever been confronted with all the different aspects around sustainability. Also, this newness to the wider concept was obviously a challenge for the conversation, and the last part of the discussion also showed that just by asking about their perception of their own farm's sustainability, the concept was defined completely differently, as discussed above. The first quoted dialogue, where one farmer explained that they use compost manure rather than pesticides, illustrated that words may have different uses and meanings, and "pesticides" in this case seemed to be confused with "mineral fertilizer". The choice of assessment method was chosen by the authors because they believed this particular discussion was valuable and that it was necessary to hear the farmers' own voice when talking about the future of Indonesian beef-cattle farming, which has been in focus since 2004 through a special programme aimed at Indonesian beef production self-sufficiency. Based on our results, the SAFA tool could potentially

and relevantly be used to open up discussions and practical implementations on the use of practices that could contribute to one or more dimensions of a future sustainable development drive, such as a joint community effort for local food systems including beef, or the use of agricultural methods without the use of external or chemical inputs.

CONCLUSION

The participants in the focus group discussions (FGDs) defined sustainability as 'being able to sustain the farm in the relatively near future'. At the same time, being presented with a wider concept of sustainability, they were able to identify and relate some of their own agriculture practices to these sustainability dimensions. They were surprised that several of their own daily agriculture practices contributed to sustainability as seen from a broader perspective, and also, realized that there were plenty of possibilities to improve their working practices. According to the participants, beef-cattle farming will survive in the future if farmers can improve their farming management. The FGD participants had concerns related to their future possibilities to continue in farming, such as a perceived lack of commitment from the government to protect farm land, which had a great influence on the availability of feed resources.

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6. General Discussion

The first research question was How do Indonesian smallholder farmers perceive their own beef cattle production and the current policy, with particular focus on the way in which it was implemented. I became inspired by the idea of *"*Putting the last first*"* by Chambers where he argued that *"we need to step down, sit, listen, and learn from those who are weak"* (Chambers, 1983; Bebbington, 1993; Chamber et al., 1997). He viewed the farmers in this perspective as a group of people who were vulnerable in many respects, for example in relation to agricultural policies. Bebbington (1993) also argued for the importance of understanding and responding to the thoughts of the rural people who had to cope with difficult situations. Hence, farmer' ideas ought to be taken very seriously by policy and decision makers, especially because they are the actors on the ground and they are the target group of many development policies. Farmers are not only able to adjust and respond to the policy, but they are also able to act, take decision and participate in the development. The idea of bringing the understanding of farmers' perceptive into the debate will contribute to the improvement of the policy implementation.

The results regarding how farmers experienced the implementation of the BSSP (Paper 1) showed that the farmers perceived the implementation of the BSSP as individual elements which we called *"*fragments*"*. Examples of these fragments were feed subsidies, a vaccination programme and artificial insemination. From the farmers' view, the farmers perceived the BSSP as a policy solely aimed at reducing imports, and they were not seeing BSSP as a whole program to improve the cattle production system in Indonesia. In relation to this, the idea of "putting farmers first" gives relevant perspectives on how this implementation could be improved from the farmers' point of view. Chambers et al. (1997) suggested that it is crucial to develop approaches to enable farmers to take part in analysis and identifying priorities in the implementation of the policy such as strengthening farmers' experience, helping them adapt better in changing conditions. It is necessary to understand the farmers' perspectives to shape recommendation regarding implementations of policies, and in this case, where a number of activities were offered, it would seem fairer to the farmers to have given them an informed choice between activities. In order to develop policy options which could serve farmers' need, farmers need to be involved (Scoones and Thomson, 1994). The contribution of the farmers-first paradigm to the sustainable agriculture is to identify farmer's practices and prioritize problems and,

consequently, to help farmers towards more sustainable practices as well as to shape the most relevant policies (Bebbington, 1993). Bebbington (1993) also mentioned that when considering policy responses to the problem of unsustainable resource-using practices, we need not only to understand the social origins of these practices. It is also important to address what the farmers say in order to build any viable strategy of sustainable development, the primary concerns of which are to alleviate the experienced poverty of rural people.

1. Perspective of the extension agents

To discuss the results of the interviews with extension agents (Paper 2), the actor perspectives by Norman Long (2009) can be helpful to explain and discuss how the different interactions, negotiations and social struggles, taking place between several actors, can potentially influence the situation of how the actors deal with the implementation. In the end, this will also affect outcomes of the policy - the communication and relationship among the actors (Long, 2009).

The second research question was to investigate the extension agents' perception of their own role and working conditions in relation to implementing the Indonesian beef self-sufficiency program. The interviewed extension agents revealed many aspects of how they felt squeezed between and often were unable to meet all the expectations that they felt the government had to their contribution to the sector, the implementation of the BSSP and on the expectations from the farmers. The extension agents felt insufficiently trained and had insufficient access to resources in many respects. There were gaps related to their role in implementing extension service. The Indonesian extension agents have tried to respond to the demands from many sides and developed strategies to close the gaps. Extension agents have a crucial role in agricultural extension services to promote agricultural innovation processes (Swanson at al., 1997). The extension agents' role is in the middle of the authorities and the farmers. The extension agents should be sensitive in their interactions with the farmers, and they should understand how farming systems operate and use this understanding in designing and evaluating the technologies offered to the farmers (Swanson at al., 1997). On the other hand, the extension agents' role is bringing the policies and programs to the farmers. They are responsible for implementing policies, but they also need to interpret and translate the policy to the farmers (Lipsky, 2010). The extension agents faced lack of resources. It was a basic problem for the

extension agents that they constantly depended on time and money from their employer and not always could transfer knowledge in the way which they found most suitable (Lipsky, 2010). Lipsky (2010) mentioned that social workers are part of the policy structure in their field, and their decisions on how to carry out as well as the conditions under which they have to do their work in the field will influence the success of governmental programs in that area.

Swanson and co-authors, (1997) stated that extension service must be participatory in its approach to create the enabling conditions for sustainable farming practices based on locally available resources and on local skills and knowledge.

Swanson et al. (1997) mentioned three major lessons for extension, which could be relevant when introducing a policy like the BSSP. First, they mentioned the importance of making new technologies and knowledge visible to demonstrate the feasibility and benefits of sustainable practices to motivate the farmers to take ownership of these new technologies. The second lesson emphasizes the use of local resources when introducing sustainable farming practices. The third lesson is more emphasis on facilitating learning in groups of farmers in order to better adapt new technologies on their farms (Swanson, et al., 1997). Based on extension agents' interviews, we concluded that it was very important to improve the involvement of the farmers and encouraging them to participate in deciding what kind of extension services programs are suitable for farmers.

2. Potentially contrasting views between farmers and extension agents

The results of the interviews with the farmers showed that the farmers felt that the BSSP did not offer them solutions that were useful to improve their life situations but were more focused on solely reducing beef import. The extension agents did not feel that they had substantial decision powers over policy development, and they had no influence on the implementation of the BSSP. The extension agents had not felt able to explain the whole program, including its overall aims, to the farmers, because they found it quite complex and therefore not possible to easily explain to many of the farmers with a low educational level and due to time constraints. Therefore, the extension agents had only explained a little part of the BSSP, typically around the activities that they had learnt about at the LFO information meeting that were in focus and planned for each particular area, such as the feeding program or the program about live cattle donations. They felt that they had difficulties in fulfilling their role as representative of the government working in

government structure and tried to work with limited resources. This illustrates an area where different perceptions existed between farmers and extension agents. Shore and Wright (1997) mentioned that implementation of a policy will shape the way in which individuals construct themselves as subject, e.g. taking a certain role. In this case, the contrasting perceptions of whether it was suitable or not to explain the whole BSSP seemed to have contributed to the creation of a gap between farmers and extension agents.

When a farmer does not have the overview over a governmental policy, even though it involves their farm, it is impossible for the farmers to be creative and innovative in the implementation process of the BSSP. It is important to understand how a government program is perceived by the community in which it is going to be implemented. Hence, providing better information on the policy and technical advice to the farmers helps them to improve productivity and contributes to achieving the overall policy goal (McCulloch, 2008).

4. Where did the perceptions of farmers and extension agents meet?

The results of the interviews with farmers and extension agents showed that the implementation of the BSSP was not well coordinated between the different government offices. Both the farmers and the extension agents experienced that although the BSSP was supported by the government with a number of diverse activities, there was no coherent support from other government institutions regarding how to distribute these benefits, disseminate knowledge, or assist farmers on how to increase production in their farms and how to balance this with other farm priorities.

Chambers and Conway (1991) stated that sustainable development comes with active engagement of all actors surrounding a policy development and implementation – like decision makers, government employees, civil society, and the private sector – through networks, associations, and communications which are all working together in a coordinated way. Both farmers and extension agents were important actors, and both felt that there was insufficient coordination in the implementation process.

5. Exploring how ”beef self-sufficiency” can be understood in relation to the concept of sustainability in a smallholder farming system context

By bringing the concept and ideas of ”sustainability” into the discussion about Indonesian smallholder beef farming, I indirectly open the discussion about how the

Indonesian government's ambition to be self-sufficient can be understood in relation to the concept of sustainability in the smallholder beef cattle farming system in Indonesia.

According to extension agents, no formal report exists at any level – from the central government to the Semarang Regency – regarding an evaluation of the BSSP. Detailed calculations of how much each region should produce seem not to exist. In the interviews with the extension agents, they questioned the long-term impact of the program as well as the future of self-sufficiency in beef production. I argued that there is concern about the long-term effects of the BSSP not only for this current period but also for the future (Permani, 2013), including how to become self-sufficient in sustainable farming. Within this context, the continuity of small family farms is a key point when discussing the sustainability of livestock farming systems (Bernués et al., 2011). The capacity of smallholder farming systems to adjust to global challenges such as climate change and resource allocation as well as their tradeoffs is fundamental in order to satisfy societal demands (for public goods such as the demand for food production). Pretty et al. (2013) noted that improving the productivity of smallholder farming systems will contribute to creation of jobs and will improve the local economy as well as provide local food security. Bernués et al., 2011 stated that one of the attributes of becoming sustainable is self-sufficiency and the capacity of the smallholder farming system to regulate and control its interactions with the environment in a sustainable manner. I argued that becoming self-sufficient in sustainable farming is a long process, and it requires the support of all parties in the community, including public support, e.g. encouragement of the public to buy local food products.

6. Discussion of the SAFA framework in relation to the life and situation of Indonesian smallholders farmers

Binder et al. (2010) mentioned that the use of a sustainable development framework allows for a more coordinated policy making to promote a better and more equitable world. Hence, decision-makers need a tool for sustainability assessment that can help them decide on which actions to take in the attempt to make society more sustainable (Devuyst, 2001). The sustainability assessment is needed to answer the third research question, and based on the results of the assessment, I will discuss the aspect of sustainability among Indonesian smallholder beef cattle farmers.

The results of sustainability assessment developed by FAO (SAFA assessment) explained how the different sustainability performances between the analysed systems seem to be related with limited access to information and knowledge as well as networks and economic resources. The larger room for sustainability improvement relies in the family farming systems. The assessment results can be a motivation for internal improvements, but to give recommendations for the local government, in which themes of sustainability need to be improved in the future, especially smallholder farmers with little resources to improve their sustainability performance (FAO, 2013). Therefore, Steinfeld et al. (2006) proposed some activities such as increasing the awareness, information, and training and facilitating sustainability related investments, for instance, finding and supporting suitable and economical solutions, in order to develop practices and processes to improve efficiency, while reduce the environmental and social impacts.

7. Different perspectives on sustainability between farmers and the FAO-based SAFA framework

The results of the interviews with the farmers (Paper 1) showed how the farmers faced many challenges related to improving beef cattle farming practices. The studies by Hadi et al., (2002) and Permani (2011) stated that most of the beef cattle farming in Indonesia are based on smallholder farming systems. Most of the farmer families in this study did not have many resources. Also, the lack of education in cattle farming was a major challenge for the farmer families who wanted to improve their performance in beef cattle farming (Paper 1). The improvement of the productivity of small scale farming systems is required since beef cattle production relies on smallholder farming systems. It is important to consider to assist smallholder farmers and to identify approaches that will help smallholders farmers adapt and apply sustainable farming practices. All decisions by the government and other stakeholders must take into account the diversity of opportunities and problems faced by smallholder farmers (Dixon et al., 2001). Dixon et al., (2001) proposed initiatives to improve smallholder farm productivity through increased small farm competitiveness, improved resource access, and enhanced human resource development. Such initiatives could include for example improved marketing and processing, expanded availability of financing, integrated technologies for sustainable productivity, improved land policies, improvement of the role of extension services, and farmer capacity building.

Paper 4 was based on two focus group discussions (FGDs) using the results of the SAFA assessment as a tool to initiate and facilitate the discussions of what ”sustainability” means to them with regard to their daily practices, both in their daily working life and after being confronted with the results of the SAFA assessment conducted on their farms (Paper 3) in the beginning of FGDs.

The participants in discussions had not heard about the concept of sustainability before. As moderator, I explained to the participants that the aim of focus groups was to encourage people to talk to each other about their perception on sustainability after they heard of the sustainability concept from FAO. My job was to keep the group focused and to generate a lively and productive discussion (Kitzinger, 1995). I realized that using the FAO SAFA framework as a tool in a focus group discussion was helpful. It guided the focus group discussion. The results show that the group participants defined sustainability as something like ”practices that enable them to sustain the farm in the future”. The interviewed farmers thought of sustainability in a day-to-day context rather than as a multi-dimensional concept. In other words, they need to be aware of practices that will give benefits to the farmers and their farms in the future. The participant views were very important results of the focus group discussions. The participants could also see that the practices that will enable them to sustain their farms in the future were categorized into the four dimensions of sustainability. The focus group also encouraged the group members to participate in the discussion and also provided new knowledge for the participants which they never would have obtained in individual interviews. The group discussion participants contributed by adding explanation or by expressing agreement or disagreement (Halkier, 2010).

The farmers’ discussions of different aspects of the sustainability concept reflected a gap between the multi-dimensional view developed by many teams of scientists and practitioners in the field in a process led by FAO, and the view of a group of farmers working at farm level. They are mostly focused on making things work on a daily basis in their farming practices and their perception is much more down-to-earth and is based on their experience running their own farms. The different perceptions of sustainability are influenced by what is important in peoples’ lives (Sumner, 2005). This thesis show that the farmers' value perceptions were related to what they find important in life — their fundamental value orientation (Sumner, 2005; Boogaard et al., 2011). In their view, sustainability was very much about being able to continue farming, survival of the farm,

e.g. the importance of no cow mortality or dangerous diseases in their farm, and about being able to hand the farm over to the next generation. Hence, it suggest more efforts to promote sustainable farming practices which is easily adopted by farmers that can improve farm productivity, enhance local food security and environmentally friendly.

8. The importance of empowerment processes as part of extension

Above, the importance of respecting farmers as people, professionals, and colleagues was emphasized. Farmers have their own knowledge and skills to understand their own situation and to contribute to their own development. The farmers' contribution mean that they are not only able to take and adopt whatever the government offers to them, but also possibility to take ownership of the government's program and bring it into their own context. This point to the necessity of including empowerment processes to improve farmers' participation and leadership in the development. Although some of the activities were highly appreciated by some of the farmers, such as the vaccination programs, they did not feel involved in the implementation of a larger policy. The farmers should be able to take the initiative as participants by actively engaging in giving feedback to help improve policy (Thornley, 1999). An empowerment process would focus on peoples' ability to take control over own life situations (Perkins & Zimmermen, 1995). Maybe they could then improve their situation and consequently the beef-cattle production on their farm by selecting the services that best suited their particular situation. Boström (2012) suggested that strengthening farmers' participation and empowerment process can be done through the farmers' organization by improving collaboration and communication among farmers and government workers as well as by facilitating social learning. It is important for a farmer to have the overview of a governmental policy in order to be creative and innovative in the policy implementation, such as the BSSP. It is also important to realize that each small decision can make a difference and can contribute to advancing the entire farming system towards it becoming a more sustainable form of agriculture, for example applying manure treatment to improve environmental condition. Moreover, this empowerment process requires commitment from the government as well as government employees, e.g. extension agents, to help the farmers to contribute in the development and to take ownership of their development. Hence, it is also important to improve extension agents' skills by identifying which training is necessary to enhance their role and performance of

extension services. Without essential reforms of the extension service, the famers will not be optimally supported (Scoones and Thomson, 1994).

9. Limitation of the studies

In the thesis, four papers provided different types of insight into the situation of smallholder beef cattle farming in Indonesia and on basis of this to discuss aspects of sustainability and the implementation of the policy of the so-called Beef Self-Sufficiency Program (BSSP) in Indonesia. The data gathering was carried out in Semarang Regency, Central Java Province, and I am fully aware that they do not cover the entire Indonesia. Further research is needed to cover a larger geographical area in Indonesia and to get a better overview over the situation of smallholder beef cattle farming in Indonesia. Moreover, further research is needed to cover and assess other stakeholders in the Indonesian beef cattle farming system, such as decision makers in the higher levels of the government structure in the Directorate General of Livestock and Animal Health Services, cattle breeders, feed animal companies, and retailers.

7. Overall Conclusion

The interviewed farmers did not perceive the BSSP as whole program, but rather viewed it as individual programs. They mainly obtained the information about BSSP from the television, and this had further confused them into seeing the BSSP not as a program to improve the cattle production system in Indonesia, but rather as a policy solely aimed at reducing imports. The interviewed farmers considered that the implementation of the BSSP was not well coordinated between the different government offices.

The extension agents perceived their own role and working conditions in relation to the implementation of the Indonesian beef self-sufficiency program very much as squeezed between the government's expectations to their implementation efforts and efficiency, on the one hand, and on the other hand, the farmers' expectations on availability, assistance, and donations. The interviewed extension agents revealed that they were unable to meet all the expectations.

The results of the SAFA sustainability assessment concluded that the larger room to improve the sustainability performance relied in the family farming systems with little resources. Within this context, farmers perceived the ability to continue farming as their key focus point when discussing "sustainability of the livestock farming system", rather than seeing it as a multidimensional concept. Besides this, the capacity of the smallholder farming system to regulate and control its interactions with the environment was a focus area. The assessment results themselves can be a motivation for internal improvements, but also an important tool to give recommendations to the local governments of which themes of sustainability need to be improved in the future. The farmers' discussions of different aspects of the sustainability concept reflected a gap between the multi-dimensional view developed by scientists and practitioners, and the view of a group of farmers working at farm level, and who are mostly focused on making things work on a daily basis in their farming practices and it is much more down-to-earth based on their experience running their own farm.

8. Future Perspective

The thesis applied a combination of methodologies, such as semi-structured individual interviews of farmers and extension agents, and semi-structured interviews based on SAFA assessment guidelines developed by FAO and FGDs. The method gave insight into the life situations and conditions of smallholder beef cattle farming systems in Indonesia.

Based on the finding in this thesis, in order to improve methodological research in sustainable development research, I could see how important it could be to include participatory research and action research in the development of Indonesian smallholder beef cattle farming system, in the future. Participatory research and action research approaches can be recognized not only as a way to achieve local impact but also to generate strategic knowledge, methodological principles and approaches through participation of the stakeholders to give contribution as implementers and facilitators in order to improve smallholder beef cattle farming system in Indonesia.

It is my hope that this thesis motivates improvements in future planning of implementation strategies of governmental policies, and in this way is beneficial to government institutions and other stakeholders. Furthermore, it is my hope that it can help seeing the necessity of a systematic approach to identifying alternative approaches to create sustainable farming practices. This thesis points to the fact that concepts like sustainability have not been raised explicitly in a dialogue between farmers and government. Sustainability development can only be achieved through a long process with participation of all involved partners. Today's generation must be introduced to and motivated for working with concepts of sustainability and implement them in practice. This points to the urge of conducting more research about social perception of sustainability among Indonesian citizen to promote and stimulate the thinking about sustainability, not only for beef cattle sector but also other sectors. This thesis can be the first step to obtain adequate information to develop and gain awareness of a sustainability approach and an adaptive approach emphasizing continuous improvement as social preferences, norms, economic and environmental conditions change over time. This is a challenge that must be faced by us to be involved in promoting sustainable development.

Interdisciplinary research is required to better understand the sustainability concept in the Indonesian beef cattle farming system, e.g. a combination of social science and animal science as important components in the sustainable development of the livestock farming system.

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